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Electric Tugboats

THE putting into Thames service during the past week of the *Lectro*, which follows hard on the maiden trip of the *Acklam Cross* on the Tees, marks an important new application of electricity. These are the first electrically propelled tugboats to be commissioned in Great Britain, but we should expect from the interest taken by various transport authorities in their initial trips that they are only the forerunners of many vessels of the same kind. Indeed, we hear as we go to press that the owners of the *Lectro* are satisfied enough with her performance already to order a sister vessel.

It is somewhat surprising that the electric tug has not had a vogue before in this country, as all the chief advantages of electric propulsion, which have been recognised in relation to larger vessels, apply with even greater force to the tug. These advantages are: (1) ability to obtain any desired speed reduction between the main engine and the propeller shaft; (2) maintenance of maximum engine efficiency at all speeds of propulsion; (3) ease of manœuvring and running astern; and (4) full control of the machinery from the navigating bridge or other positions.

The development of the high-speed oil engine has been of especial importance in this connection. As tugs are required to operate in crowded docks their overall dimensions must be low. The high-speed oil engine needs less space than a reciprocating steam engine with its boilers or than steam turbines for both ahead and astern working. The *Lectro* is said to be the most powerful boat for her size on the Thames. While a high speed is desirable for the engine, a low propeller speed is essential; this speed reduction is made simple by the electric drive.

Again, if two engines driving generators are installed, one can be run alone when not towing; alternatively the tug can then be worked at a greater speed, in which case the motor would be designed to give its maximum power at the higher propeller rotation with the two generators in parallel. Thus the machinery can always be operated at maximum efficiency, and the installation of two prime movers gives added reliability.

The frequent changes from full ahead to full astern (as when marshalling a tow or entering a dock) are brought about by extremely simple control of the propelling motor only (without altering the speed or sense of rotation of the engine) from a remote point, thus eliminating delay between the giving and the execution of an order—a most important point in tugboat work—and making impossible misinterpretation of instructions.

Experience in the United States (where a large number of vessels of this type have been built) is that the Diesel-electric tug costs initially about 20 per cent. more than the plain steam tug, but that its operating costs, including capital charges, are less by 20 per cent. There is thus a *prima facie* economic case for the adoption of the method, quite apart from its inherent practical advantages.

The American Effort

THE latest information to hand regarding the efforts of American electrical manufacturers to co-operate with the President in his National Recovery plan is not very promising. The Board of Governors of the National Electrical Manufacturers (600 in number) met in Cleveland a week or two ago and divided the industry into seventeen groups, of which particulars are given on p. 572 of this issue. It is obvious, however, that, while the industry has made sacrifices to facilitate the working of the programme of the President, the demands advanced by labour are far in excess of the provisions included in the Code, and the Manufacturers' Association will resist these excessive demands and protect its interests in every practicable and legal way. One writer says that the electrical manufacturers' organisation sees nothing less than the whole N.R.A. programme gravely imperilled by the march of events, and it is definitely emphasised

by some authorities that the recovery effort cannot possibly succeed unless industry is profit-earning. Mr. J. S. Tritle, the president of the N.E.M.A., in observations on the general effect of the movement on the future of industry, forecasts that the plan will gradually pass from the status of emergency legislation to a permanent policy. Government may take more direct interest in the operations of industry in order permanently to stabilise the whole economic state. Supervisory jurisdiction over all industry is predicted, and the electrical industry may reduce the chances of Government interference by effectively regulating itself now. But Mr. Tritle thinks that proposals of labour leaders must retard rather than speed up prosperity.

Distribution Reform Needed

THE presidential address which Mr. J. M. Kennedy delivered on Tuesday to the Association of Supervising Electrical Engineers is full of good points, most of which will have to be considered seriously during the coming winter. Mr. Kennedy is a supporter of the principle of co-ordinated distribution, and there is unfortunately a good deal of ground for one of his arguments that electricity is handicapped in the great field opened up by housing schemes and slum clearances by the very different ways in which the various undertakings regard their responsibilities. To the advantages of co-ordination cited we think standardisation of voltage should be added as one of the most urgent of distribution problems. Mr. Kennedy is not favourably impressed by the scheme, said to be in preparation, whereby undertakings selling less than three million kWh per annum are to be merged in their bigger neighbours, reducing the number of authorities from 663 to fewer than 250, unless the consumer policy of the larger bodies is to be subject to control by Area Distribution Boards. Proper safeguards to this end should be incorporated in any legislative measure that may be introduced, as otherwise abrogation of rights by a smaller undertaking would not always serve the interests of the consumer.

Tapping the Grid

A CORRESPONDENT this week refers to the high capital cost of tapping the grid as a limiting factor in rural development. The figure he gives, £46,000, would be a not unreasonable estimate if the type of sub-station that represented general practice on large supply systems had been adapted to grid conditions, but the development of the "single-switch" sub-station has enabled transforming points with capacities of up to 3,000 kVA to be constructed for less than £20,000. This is, however, by no means the best that can be done for giving small high-voltage supplies, as researches initiated by the Central Electricity Board have resulted in considerable further reductions in cost. Thus, at Glenlee, in South Scotland, a 3,000-kVA 132/11-kV transformer has been connected to the transmission line by an isolating switch and a carbon-tetrachloride fuse at a total capital expenditure of approximately £4,000. And we do not suppose that this is the last word on the subject.

Portishead's Achievement

IN our issue of June 30th when commenting on the Electricity Commissioners' fuel returns, we drew attention to the remarkable results achieved at the Portishead power station of the Bristol Corporation for the calendar year ended December 31st last. The consumption of 1.15 lb. of coal per kWh generated was the lowest yet achieved by any British station, but a still further improvement was made between the beginning of this year and the end of March, so that for the municipal year the figure fell to 1.134 lb. This was due to a considerable reduction in the amount of coal burned—to 1.117 lb. per kWh in the three months, during which some 42 million kWh was generated at a load factor of 57 per cent. Mr. A. J. Newman, the chief engineer and general manager, and his staff have every reason to feel gratified at this result, which is especially noteworthy in view of condensing difficulties; the maximum tidal variation is over 50 ft., which has complicated the arrangements for providing an adequate supply of circulating water.

Irony

THE King's Bench case, reported on a later page, appears to raise the question as to whether the supplier of an electrical appliance is to be held responsible for defects arising in operation. A short-circuit in the plug of an electric ironer burned the operator's hand, but Sir Duncan Watson, appearing on behalf of the defendants, was able to show that one of two screws, which secured the cover to the base of the adaptor, was missing, and that but for this the accident could not have taken place. Judgment was entered for the defendants; if the ruling had been otherwise an impossible situation would have been created for a merchant or contractor.

Holding Aloof

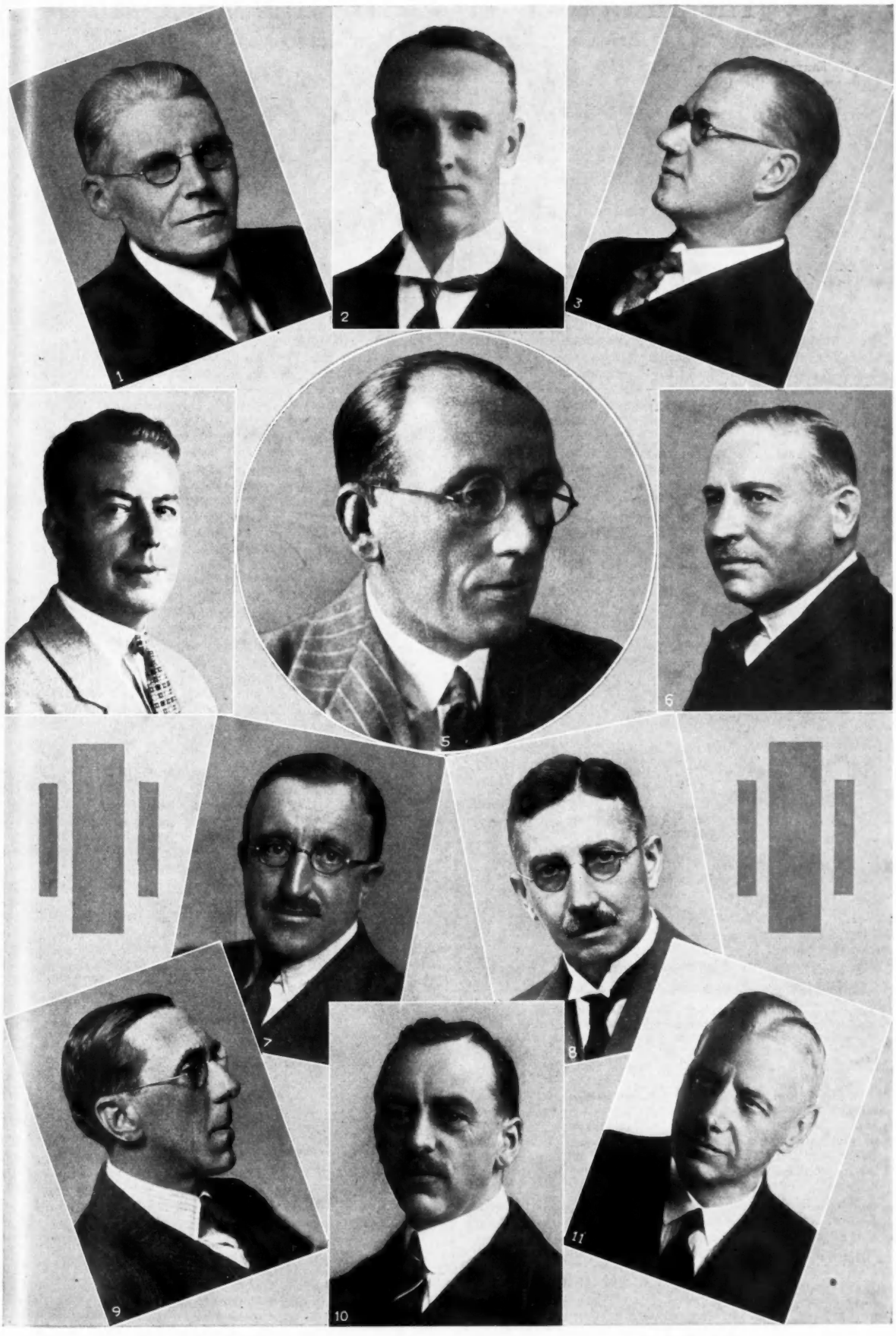
THE boiler house of Pinkston power station, which supplies the Glasgow tramways, has been modernised, as a result of which an annual saving of 21,000 tons of coal is expected. Councillor J. P. Dollan, ex-Convener of the Transport Committee, is reported to have said that "Co-operation with the grid would have been a tragic mistake." If the cost of electricity would have been increased by coming into the national scheme, this attitude would be legitimate enough, but the Act of 1926 makes such an increase impossible. The reason given was the need for the Transport Department to retain control of the generating station. We do not see the necessity; to follow this argument to its logical conclusion an undertaking should also own the colliery from which its fuel is drawn, and so on.

Lady Parsons

LADY PARSONS was one of the most eminent of the band of women who, as one of their number has expressed it, are "engineers by marriage." For the deep interest she took in the work of her husband, the late Sir Chas. Parsons (whom she survived by twenty months), the world owes her much; her sympathy with his aims undoubtedly made it easier for him to give full rein to his scientific bent and so to play his great part in engineering progress. Their daughter, Miss Rachel Parsons, carries on the tradition, having been trained as an engineer at Cambridge. Lady Parsons has a second, and more individual, claim to public recognition; she was one of the founders, and the first president, of the Women's Engineering Society, from which the Electrical Association of Women was an offshoot.

Overseas Trade in September

THE figures relating to British overseas electrical trade during last month on page 562 bear a more satisfactory aspect than for some time past. As compared with August, exports showed a rise in value of about 10 per cent., while they were 15 per cent. above the September, 1932, total. The increase was fairly general among all the items. Although machinery exports were considerably higher than in August, as compared with the corresponding month of last year there was a small net decline. The most outstanding increase occurred in the case of telegraph and telephone apparatus. Imports also rose above the August figure, but they were lower than in September last year. Only two items are outstanding—the increase in telegraph and telephone apparatus as compared with August and the fall in unenumerated goods as against the corresponding month of last year. The figures give ground for optimism; the increasing favourable balance is an encouraging sign.



The President and Chairmen of Sections and Centres of the I.E.E.

1. Mr. M. Lawson, Meter and Instrument Section. 2. Mr. G. Shearing (*Vandyk*), Wireless Section. 3. Mr. G. G. L. Preece, North-Western Centre. 4. Mr. J. N. Waite, North Midland Centre. 5. Mr. P. V. Hunter (*Lafayette*), president. 6. Mr. A. Nichols Moore, Western Centre. 7. Mr. F. H. Williams, North-Eastern Centre. 8. Mr. B. Welbourn (*Jas. Bacon & Sons*), Mersey and North Wales (Liverpool) Centre. 9. Mr. N. C. Bridge, Scottish Centre. 10. Mr. F. C. Porte, Irish Centre. 11. Mr. J. Coxon (*Whitlock & Sons*), South Midland Centre. (*Photographs Nos. 1, 3, 6, 7, and 9 by Elliott & Fry.*)

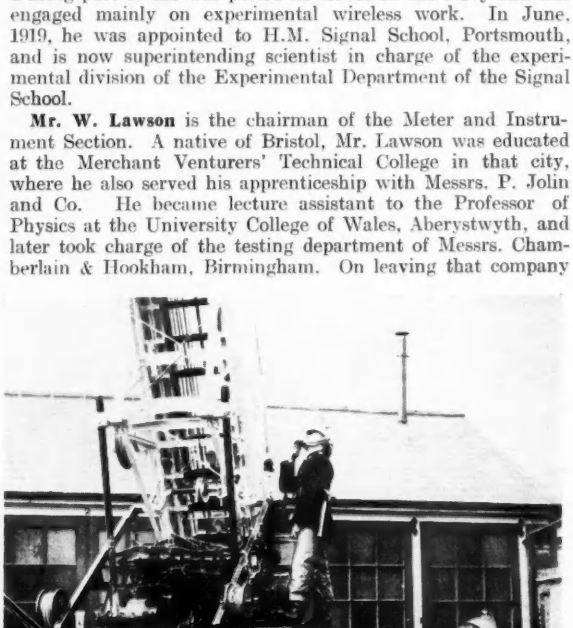
The Institution of Electrical Engineers

Brief biographies of the new chairmen

ON Thursday next the London meetings of the 1933-34 session of the Institution of Electrical Engineers will commence with the president's inaugural address. The chairmen of several of the centres have delivered their addresses during the current week. We therefore reproduce on the preceding page the portraits of the president and the chairmen of the Wireless and Meter Instrument Sections, and of the local centres. In our issue of June 9th we published a full account of the work and activities of Mr. P. V. Hunter, president, who is so well known as the joint manager and chief engineer of Callender's Cable & Construction Co., Ltd., and by reason of services rendered to the profession and industry.

Mr. G. Shearing, O.B.E., B.Sc., chairman of the Wireless Section, was educated at Hartley University College, Southampton. After commercial experience with various engineering firms, he was engaged in electrical engineering teaching work at the Northampton Institute, the University of Birmingham and the University College of Southampton in turn. During part of the war period he served in the Navy and was engaged mainly on experimental wireless work. In June, 1919, he was appointed to H.M. Signal School, Portsmouth, and is now superintending scientist in charge of the experimental division of the Experimental Department of the Signal School.

Mr. W. Lawson is the chairman of the Meter and Instrument Section. A native of Bristol, Mr. Lawson was educated at the Merchant Venturers' Technical College in that city, where he also served his apprenticeship with Messrs. P. Jolin and Co. He became lecture assistant to the Professor of Physics at the University College of Wales, Aberystwyth, and later took charge of the testing department of Messrs. Chamberlain & Hookham, Birmingham. On leaving that company



This fire escape, belonging to the Ilford Fire Brigade, is equipped with an 11-in. searchlight and a loud-speaking telephone for communication from the ground to the top

he commenced his work with the Birmingham Electric Supply Department as meter engineer, and is now special technical assistant to the city electrical engineer, being also in charge of testing, repairs and maintenance of meters, motors, station and sub-station instruments. He is a past chairman of the South Midland Centre and has acted as meter representative for the I.M.E.A., on B.S.I. panels. At the present time he is associated with the Electrical Research Association's work on meters and surge phenomena.

Mr. F. C. Porte, who has been elected chairman of the Irish Centre, received his education at Erasmus Smith Schools and the Royal College of Science, Dublin. He became a pupil to the Electrical Engineering Co. of Ireland in 1891, and in 1895 was appointed branch manager for Messrs. Porte, Sykes & Co., of Cork, with whom he remained until 1906, when he commenced the business of Messrs. F. C. Porte & Co., and is now engaged mainly on electrical contracting work. He has been a member of the Committee of the Irish Centre for many years.

Mr. J. Coxon, chairman of the South Midland Centre, obtained his technical training at King's College and University College, London. For eight years he was a lecturer and instructor in engineering subjects at the Kingston, Wimbledon, and other technical institutes. After ten years' experience in general electrical engineering work at home and in South Africa he joined the Post Office Engineering Department in 1903 and shortly afterwards was attached to the Power Section of the Engineer-in-Chief's office until the commencement of the war. During the war he was granted a commission and was engaged on signalling instruction duties. In 1926 he was appointed power engineer of the North Wales Engineering District and stationed at Birmingham. Two years later he was transferred to the district headquarters at Shrewsbury as executive engineer in charge of the technical section dealing with engineering and technical details affecting the telephone and telegraph systems and offices throughout the North Wales area, including Birmingham. Mr. Coxon is retiring from the Post Office shortly.

Mr. N. C. Bridge is the chairman of the Scottish Centre. He was educated at Streatham Grammar School and Cranleigh, and attended the Finsbury Technical College. He commenced his electrical career in 1903 with the Newcastle-upon-Tyne Electric Supply Co., being engaged on the electrification scheme of the North Eastern Railway. He also served for a short period with the Yorkshire Electric Power Co. In 1907 he joined the staff of Strain & Robertson, consulting engineers, Glasgow, and was taken into partnership in 1916. Upon the retirement of the other partners he took over the business. The principal work carried out by his firm includes power plants abroad and engineering work for the Clyde Valley Electrical Power Co. They were responsible for the complete layout of Clyde's Mill power station and for all later developments at the Yoker power station. Mr. Bridge has served on the local committee of the Institution and also on the local committee of the Institution of Mechanical Engineers.

Mr. B. Welbourn is the new chairman of the Mersey and North Wales (Liverpool) Centre. He received his education at King's College and was a pupil with Messrs. Willans & Robinson Before joining British Insulated Cables, Ltd., he was electrical engineer to the Electro-Chemical Co., Ltd., of St. Helens. He joined the British Insulated Wire Co., Ltd., as superintendent on construction work, and when the company changed its name to British Insulated & Helsby Cables, Ltd., he became contracts manager. He is now chief engineer. Mr. Welbourn has had extensive experience in the development of paper-insulated cables, transmission line work, telephone transmission and distribution, and overhead equipment required for railway electrification. He is a past vice-president of the I.E.E. and a past chairman of the Manchester and Liverpool Centres.

Mr. F. H. Williams, the chairman of the North-Eastern Centre, was educated at Manchester Grammar School and is a graduate (B.Sc.Tech.) of Victoria University. On leaving the University he turned to electricity supply problems and had charge of the testing laboratory of the Manchester Corporation. He subsequently joined Messrs. Merz & McLellan, with whom he has now been for more than twenty years Mr. Williams has handled power station and distribution problems at home and abroad, his recent activities having been in connection with electric traction work in India. He has at the moment under his supervision the work now in progress in Kirkcudbrightshire for the Galloway Water Power Co. He is an associate member of the Institution of Civil Engineers.

Mr. J. N. Waite, the chairman of the North Midland Centre, served his apprenticeship with the Speedwell Engineering Works, Tunstall. His early appointments were as charge engineer in an electric traction power station, engineer to dyeworks, and assistant engineer to Messrs. Merz & McLellan. He joined the Newcastle-upon-Tyne Electric Supply Co., with whom he held various appointments, and left that company to become chief assistant engineer in the Stoke-on-Trent Electricity Department. His next position was deputy city electrical engineer at Bradford, where he remained until he was appointed to his present position as city electrical engineer of Hull. He is a member of the Council and various committees of the I.M.E.A. and of technical committees of the B.S.I. He is chairman of the Street Lighting Committee of E.D.A. and a member of the North Midland Area Committee. Upon the formation of Consultative Technical Committees by the Central Electricity Board he was appointed deputy chairman of the Mid-East England scheme.

Mr. A. Nichols Moore, the chairman of the Western Centre, acquired his early technical training at the Sheffield School of Technology (now part of the Sheffield University). He served as a premium pupil with the Brush Electrical Engineering Co., Ltd., and was also for a time in the office of Mr. W. J. Walker, consulting engineer, Westminster. His first municipal appointment was with the Sheffield Corporation in 1900, and in 1902 he joined the Manchester Corporation Electricity Department. His next appointment was in the Belfast electricity undertaking, where he carried out the construction of the new tramway power station. Within twelve months he was appointed deputy electrical engineer and occupied that posi-

tion until 1912, when he became borough electrical engineer and tramways manager at Newport, which position he still holds. He is a member of the Institution of Mechanical Engineers and a member of the Council of the I.M.E.A., of which he is a past-president. He was one of the delegates from the British National Committee to the World Power Conference in 1930. He is chairman of the Central Board's Consultative Committee for the South-West England and South Wales Area, and was one of the original members of the committee appointed by the Electricity Commissioners to consider and report upon a scheme for the development of electricity supply in South Wales and Monmouthshire. For the past three years he has been chairman of the South Wales and Monmouthshire Area Committee of E.D.A. and is a member of the new Council. He is also a past-president of the Associated Municipal Electrical Engineers (Great Britain and Ireland).

Mr. G. G. L. Preece, the new chairman of the North Western Centre, is the son of the late George Edward Preece and a nephew of the late Sir William H. Preece. He was educated at Manchester Grammar School and the School of Technology, Manchester. In 1896 he joined Messrs. W. T. Glover & Co., Ltd., becoming chief electrician and head of the testing department, where he was associated with Mr. C. J. Beaver as technical expert and adviser. He has specialised in mining work, pioneering to a large extent. For many years he was special technical sales representative to the company and representative at the I.M.E.A. and other conventions. In 1910 he joined Messrs. Bruce Peebles & Co., Ltd., as special representative, particularly for mining work, and became manager in 1911 for the Manchester district. During the war he held a commission in the Lancashire Fusiliers and the R.E., rejoining Messrs. Bruce Peebles in 1919 as branch manager at Manchester; he still holds this position. He has served two periods on the Committee of the North-Western Centre, and has been vice-chairman for the past two years. He is a member of the Institution of Mining Engineers. He has been closely connected with the National Technical Groups of the E.P.E.A.

Domestic Tariffs. By G. H. Sankey, B.Sc., A.M.I.E.E.

A comparison between the two-part and flat-rate systems

IT is generally supposed that the two-part tariff gives a closer approximation to costs and at the same time greater encouragement to more extensive use of the supply. It is my object to examine the truth of this supposition by an investigation of the conditions under which each system will accurately represent costs: I suggest that the conditions found under the flat-rate system are the more likely to occur in practice and therefore that system more closely represents costs. Furthermore, if the price-fixing in each case is on the same basis with regard to assumed costs and load factors, the flat-rate system offers greater inducement to the general body of consumers to increase their use of electricity.

The term "maximum demand" is here used to mean the effective demand due to the load in question at the time of the general peak, proper allowance being made for diversity, and the term "load factor" is used for the annual load factor based on the maximum demand as so defined and on the actual consumption.

Supply Costs

It is usually assumed that the cost of giving any particular supply may be expressed in the form of a standing cost per kW of maximum demand plus a running cost per kWh. This assumption may not be strictly accurate, but it is often taken as the justification of the two-part tariff and is adopted here, hypothetical figures being chosen of £15 per kW per annum plus ¼d. per kWh; variations in the form of the cost formula would complicate the investigation but would make little difference to the conclusions reached.

If costs can be expressed in this form, the overall costs per kWh will depend only on the load factor, and, for a given load factor, will be independent of the amount of electricity consumed. This relation between cost per kWh and load factor is shown by the full curve in fig. 1. The condition on which a system of charging will truly represent costs is that the overall price per kWh is related to load factor in precisely the same manner. This condition is easily interpreted in the case of the flat-rate system where the price per kWh depends only on the purpose for which the supply is taken. The system will, therefore, truly represent costs if all supplies charged at a fixed price are at the load factor which gives the corresponding cost. Thus, on the basis of the cost figures assumed, 6d. per kWh is a fair price for lighting if the load factor of every lighting load is 7.5 per cent., and ¼d. per kWh is a fair price for all domestic power, if the load factor of all domestic power is 41.1 per cent.

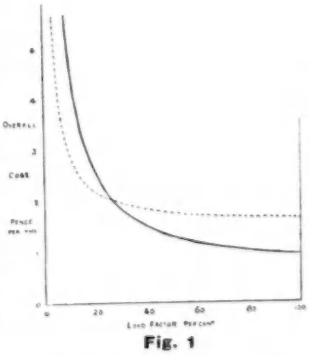


Fig. 1

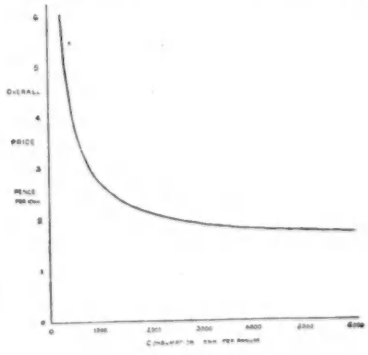


Fig. 2

The condition is not so easily determined in the case of the two-part tariff. Those who claim that this tariff gives the best approximation to costs would have us believe that because it takes the form of annual and unit charges it will give the same relation between price per kWh and load factor as there is between cost per kWh and load factor. It does not do so, and for two reasons. First, on a strict cost basis the fixed charge would be so high that the tariff would offer no attraction to the majority of consumers in the average undertaking: to consumers, that is, who are not already making very good use of the supply. The ratio of the annual and unit charges is therefore altered, with the result shown by the dotted line in fig. 1, which represents a price of £5 per kW per annum plus 1¼d. per kWh. Price and cost now agree at one load factor only.

A further departure from costs lies in assessing the demand charge on an arbitrary basis. As a consequence of this the overall price per kWh paid by the occupier of any premises will depend only on the amount of energy he consumes. Fig. 2 shows the relation between price per kWh and consumption for a consumer who pays £5 per annum plus 1¼d. per kWh. (Alteration of the fixed charge will produce proportional alteration of the scale of consumption only.)

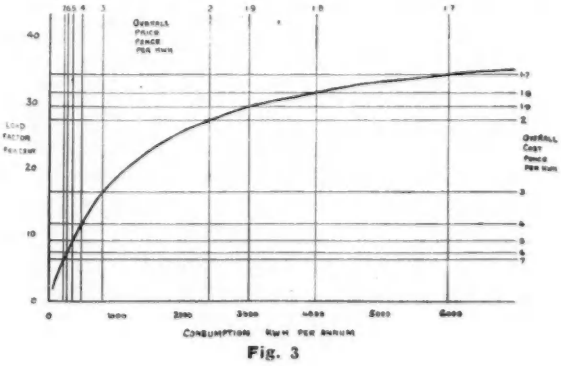


Fig. 3

Does the Tariff Truly Represent Costs?

To find the conditions under which the two-part tariff truly represents costs figs. 1 and 2 must be combined. In fig. 3 the vertical scale represents load factor and horizontal lines show the corresponding cost per kWh derived from fig. 1. The horizontal scale represents consumption, and vertical lines show the corresponding price per kWh derived from fig. 2. The intersections of corresponding price and cost lines lie on the curve which, therefore, represents the relation which must exist between load factor and consumption if the tariff represents costs. It can be verified by simple calculation that an increase of load from one point on the curve to another means an added load at 41.1 per cent. load factor. It follows therefore that if the tariff truly represents costs the consumer's load can be divided into a lighting load represented by a point on the curve and a power load at 41.1 per cent. load factor.

We have thus found the conditions we set out to determine which may be repeated in numerical form using the hypothe-

tical figures assumed, as follows: If the supply costs are £15 per kW plus ½d. per kWh, flat rates of 6d. for lighting and 1½d. for power represent costs if the load factor of all lighting loads is 7.5 per cent and that of all domestic power loads 41.1 per cent. A two-part tariff with a running charge of 1½d. per kWh represents costs if the load factor of all domestic power loads is 41.1 per cent. and that of lighting loads varies with the consumption according to the curve in fig. 3. The latter implies that, if a consumer with a lighting load at 75 per cent. load factor increased his maximum demand by 10 per cent., he would have to increase his consumption by 55 per cent., and therefore his average hours of use by 40 per cent.; if he increased his maximum demand by 50 per cent. he would have to increase his consumption by 277 per cent. and his hours of use by 150 per cent. It seems more reasonable to suppose hours of use, and therefore load factor, to be constant, and, since the conditions regarding power are identical, the flat-rate system more accurately represents costs.

It is difficult to imagine an authority adopting such a tariff as the following on the grounds that it approximates more closely to supply costs and at the same time is more likely to lead to increased domestic load. Yet this tariff is identical in effect with a two-part tariff of 12 per cent. of the rateable value plus 1½d. per kWh and flat rates of 6d. and 1¾d.

(*a*) Lighting: Up to such number of kWh per annum as will equal 16 per cent. of the rateable value of the consumer's premises, 6d. per kWh; for energy in excess of that amount, 1½d. per kWh. (*b*) Power: To consumers whose lighting account is not less than 16 per cent. of the rateable value of their premises, 1½d. per kWh. To the other consumers: Up to a number of kWh per annum equal to eighteen times the number of lighting kWh required to bring their lighting account up to 16 per cent. of the rateable value of their premises, 1¾d. per kWh; for units in excess of that number 1½d. per kWh.

Such a tariff would almost certainly be met with the criticism that the reduced rate for extra lighting is quite unrelated to costs; it represents a very substantial concession at a loss to the undertaking, by which nothing is gained, and is only possible because there is a limit to the amount of light consumers will use. The higher price for power to consumers with a low lighting consumption is again quite unrelated to costs; it is an unjust differentiation between consumers, and is calculated to retard the use of electricity for power purposes. It will be maintained that it is far better to stick to flat rates of 6d. for lighting and 1½d. for power.

Encouraging Development

The claim that the two-part tariff encourages an increase in the use of electricity for power purposes rests on the assumption that the flat rate for power will be higher than the unit rate of the two-part tariff. If the two rates are equal the flat rate obviously gives the greater encouragement to the whole body of consumers, since it offers to all a price which the two-part tariff offers to a limited number. It is hardly logical to endeavour to promote consumption by assisted wiring and hire of apparatus and at the same time charge a higher rate to consumers whose circumstances necessitate the strictest economy in the use of light. The questions therefore arise whether the low unit rate of the two-part tariff ought to be made available to all in the form of a low flat rate, and if so why two-part tariffs have been adopted.

The reasons for the adoption of the two-part tariff are, first, that it is an endeavour to copy the form in which supply costs are expressed and is therefore assumed to represent costs; secondly, believing that the two-part tariff is the best means of promoting consumption an authority often does not consider the alternative of a low flat rate; and, thirdly, if that alternative is considered the greater apparent security of the two-part tariff is the deciding factor.

For and Against the Two-part Tariff

Reverting to the case already mentioned where the flat rates are 6d. and 1¾d., suppose the authorities are considering whether to reduce the power flat rate to 1½d. or to introduce a two-part tariff with a unit rate of 1½d. If they decide on the latter course they will probably do so on the strength of the following arguments:—(*a*) The reduction in the flat rate would mean a concession on the whole present domestic power consumption, the total being easily calculated and representing an immediate "loss of revenue." (*b*) In the case of the two-part tariff the reduction of ½d. per kWh only applies to extra consumption. (*c*) The actual cost of giving supplies for domestic power cannot be separated from the general costs, and is therefore not known, but if 1½d. per kWh is less than the overall cost it is supposed that the fixed charge in some way counterbalances this.

The following counter-arguments will probably have been overlooked:—(*a*) if the two-part tariff is adopted the charges will have to be so fixed that a reasonable proportion of consumers will benefit immediately. Such consumers will obtain an immediate concession of ½d. per kWh on their existing power consumption and 4½d. per kWh on part of their existing lighting. It will probably be found that some consumers will have their accounts reduced by as much as 50 per cent. The "loss of revenue" cannot be calculated beforehand, but is likely to be as great as that due to a reduced flat rate. (*b*) Although the reduction of ½d. per kWh applies only to extra consumption, there is also a reduction of 4½d. per kWh on extra lighting consumption. (*c*) A consumer will not adopt the tariff unless he will obtain an immediate saving. The whole of the fixed charge is therefore required to meet the cost of his existing consumption and cannot make good any loss on additional energy that he may take.

Where the two-part tariff has been adopted and large quanties of energy have been sold at a low unit rate it seems clear that still more beneficial results would have ensued if the authority had been bold enough to adopt a correspondingly low flat rate.

In favour of the two-part tariff it must be said that its specious appearance of security has induced authorities to give concessions that they would not otherwise have given. and half a loaf is better than no bread. Gratitude for small mercies, however, must not be allowed to conceal the desirability of the complete loaf, namely, adequate reduction of the power flat rate.

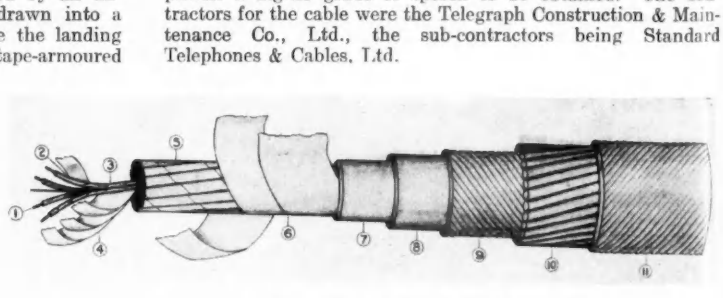
The New Anglo-French Telephone Cable

THE Anglo-French submarine telephone cable, which was recently laid from St. Margaret's Bay, near Dover, to a point near Calais, is to be used in conjunction with the proposed "on demand" trunk service to the Continent.

From the English shore the cable is extended by an unarmoured lead-covered length of similar core drawn into a conduit to a repeater station on the cliff above the landing point. At the French end it is connected to a tape-armoured cable about 1½ miles long which terminates at a repeater station on the outskirts of Calais. The cable is unloaded, the attenuation length between repeater stations being such as to ensure satisfactory transmission. A land cable to meet the submarine cable has been provided between London and St. Margaret's Bay and is equipped with suitable repeaters. On the French side a new cable has also been laid to connect the above-mentioned Calais repeater station with Paris.

The cable is designed for four-wire working, that is to say, the speech from London to Paris will pass along one pair of the wires in a quad while the return speech will be transmitted over the other pair in the same quad. In addition to the circuit at audio frequency which will be carried on each quad, there will be another circuit operated at a carrier frequency.

Some of the circuits in the new cable will be terminated at Paris, while others will be extended to Geneva, Rome, Madrid, Marseilles, and other large Continental cities. Not only will the telephone facilities be augmented, but the new cable will permit a higher grade of speech to be obtained. The contractors for the cable were the Telegraph Construction & Maintenance Co., Ltd., the sub-contractors being Standard Telephones & Cables, Ltd.



The new Anglo-French cable

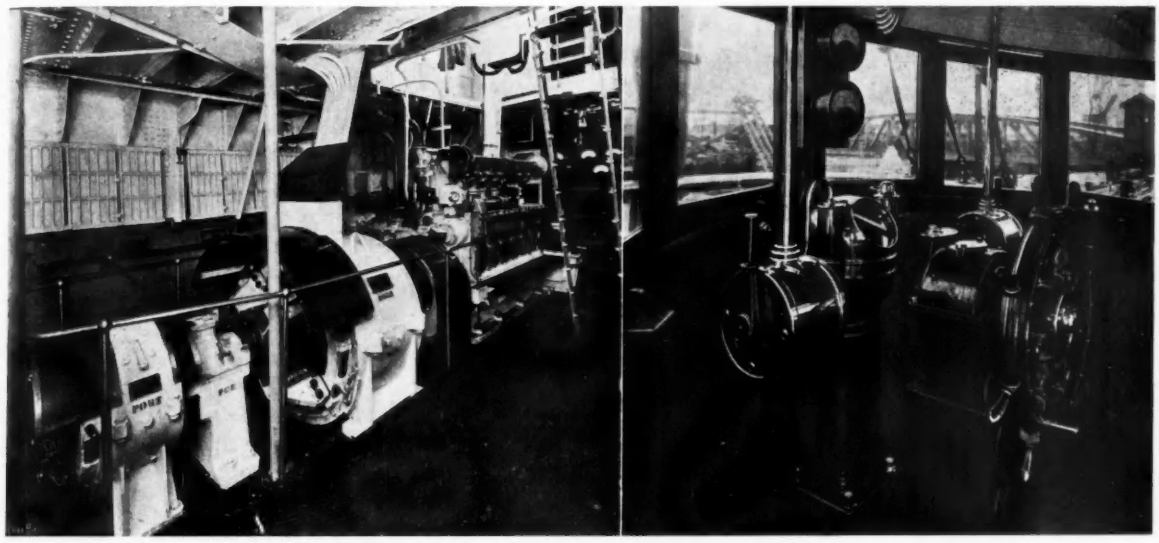
1. Solid annealed copper wire weighing 66 lb. per statute mile (diameter 0.064 in.). 2. Insulation composed of helical lappings of undyed insulating paper. 3. Four conductors, insulated as above, stranded on a paper centre to form a compact quad; insulated conductors at the ends of each diagonal of the quad form a telephone pair, which may be used separately or as part of a four-wire circuit. 4. Each quad lapped with paper specially marked for identification and electrostatically screened by means of a helical lapping of metal foil. 5. Nineteen quads stranded into a compact cable. 6. The stranded cable covered with a lapping of stout cut cotton tape and insulating paper. 7. The cable sheathed with an alloy containing about 99 per cent. imperial lead (diameter 1.58 in.). 8. Waterproofing of rubber treated and rubber tapes. 9. Covering of compounded and tarred jute yarn to form bed for armouring. 10. Armouring of twenty-five specially compounded No. 2 gauge galvanised iron wires. 11. Waterproof compounds and tarred jute yarn (finished diameter 2.95 in.).

Diesel-electric Tugboats. By A. Regnauld, B.Sc., M.I.E.E.

The first two British examples

THE Diesel-electric system lends itself especially well to the propulsion of tugs, as it permits considerable power to be installed in a small space, economical variation of load and speed, and ease and rapidity of control. A large number of electrically propelled tugboats have been built abroad, particularly in the United States, where their merits have been more widely recognised than they have been hitherto in this country.

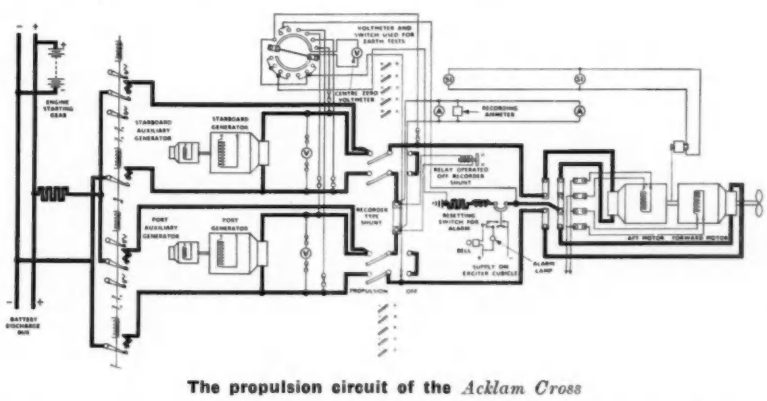
The first British-built Diesel-electric tug is the *Acklam Cross*, built by Hall, Russell & Co., Ltd., to the design and specification of Mr. R. Reed, which has just been placed in service on the Tees by Messrs. Robinson & Crossthwaite, Ltd. The whole of the electrical equipment was supplied by the General Electric Co., Ltd.



One of the 200-kW main generators and (right) the wheelhouse of the *Acklam Cross*, showing the telegraph-type controllers

The *Acklam Cross* is a single-screw vessel, 98 ft. in length, 22 ft. in breadth, with a depth of 11 ft. 6 in., and built in accordance with Lloyd's Register requirements for their highest class +100 A.1 " for towing services." She is fitted with two 300-h.p. Brotherhood-Ricardo engines constructed by Peter Brotherhood, Ltd., each engine having six cylinders 7½ in. in diameter with a piston stroke of 12 in. and a speed of 900 r.p.m. These engines are placed together on either side of the centre line of the ship and run always at constant speed but in opposite directions.

The engines are electrically started, and, as the fuel is supplied to the cylinders on the airless- or solid-injection system, the use of air compressors is entirely dispensed with. For starting purposes, two 56-cell "Exide" batteries have been installed, either of which is of sufficient capacity to start either engine, by motoring the main generator, at least six times, as required by Lloyd's Register. These batteries are also used for supplying lighting and for driving the various auxiliary motors when the main engines are not running. The *Acklam Cross* is the first electrically propelled vessel to be started in this way. A recording instrument with three pens shows the current supplied for propulsion and also the outputs of the auxiliary generators.



The propulsion circuit of the *Acklam Cross*

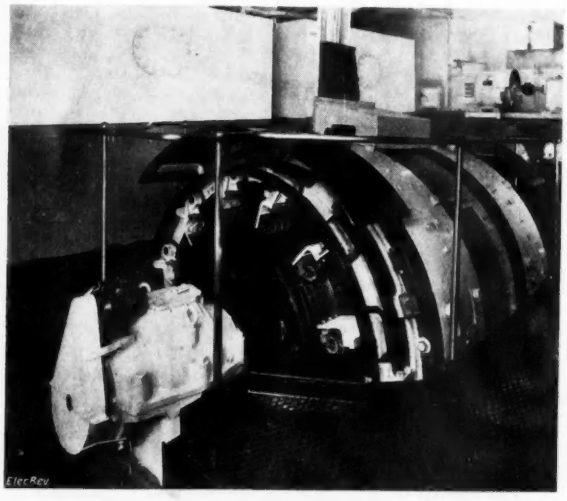
Coupled to each engine in tandem are two d.c. generators, one of 200-kW capacity for supplying the current to the main propulsion motor and the other of 20-kW capacity for supplying the excitation current as well as the current for lighting purposes, and for the various auxiliaries. The two main generators are connected in series, each giving 250 V, and as each machine is separately excited, the voltage may be varied from +250 to −250 V. By this means it is possible to control the propeller motor on the Ward-Leonard system. The auxiliary generators are of the multi-polar compound-wound type, the magnet frames being fabricated, as are those of the main generators.

The 500-h.p. main-propulsion double-armature motor is direct coupled to the propeller shaft; the speed is variable between 90 r.p.m. ahead and astern for towing and 115 r.p.m. ahead and astern when running light. The fabricated magnet frame is split along the horizontal axis and machined inside, while the frame can be rotated to give access to the coils in the bottom half. The two armatures are mounted on a through shaft provided with a forged-on half coupling at the after end for bolting to the propeller shaft through a Michell thrust bearing.

In normal running the main generators and the two halves of the propelling motor form a single series circuit, the mid-point between the two motor armatures being earthed through a resistance and circuit breaker. The propeller speed is varied, and reversing is accomplished by varying or reversing the excitation current of the two generators. The propeller motor can also be run at reduced speed from one generator only. Further, either half of the propeller motor can be isolated by means of links mounted on top of the motor frame, the half remaining in circuit being used for propulsion at reduced speed. Normally, one auxiliary generator is sufficient to supply the excitation current, the other being used for battery charging and general service. Automatic voltage regulators of the carbon-pile type keep the excitation voltage constant even if the engine speed varies; a hand voltage regulator is also provided. A latch-type contactor, inserted in the main propulsion excitation circuit, is tripped out by an over-current relay at excessive overloads. The tripping of the latch contactor removes the excitation from all machines.

Advantage has been taken of the electric propulsion system to provide bridge control of the propelling machinery. There are altogether four positions outside the engine room from which the vessel may be controlled, two in the wheelhouse and two on the flying bridge. Controllers of similar form to the usual type of engine room telegraph are provided, the

handles being mechanically coupled so that all four operate together. By means of a transfer switch, designed so that it can be moved only after all excitation is cut off, control may be transferred to the engine room manœuvring hand wheel



The 500-h.p. double-armature propulsion motor of the *Acklam Cross*

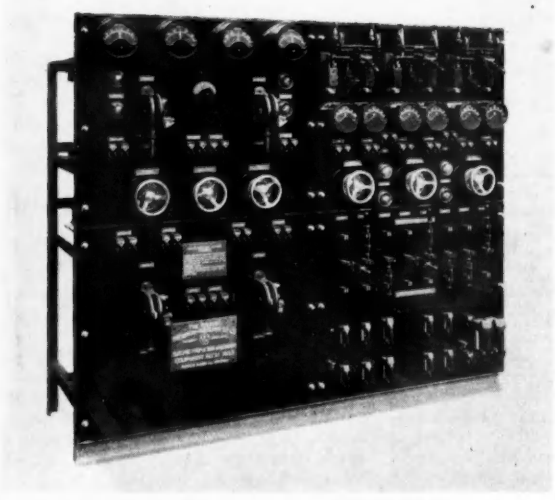
mounted on the control board, orders being then given from the bridge in the usual way. The four-panel control board is of the "dead-front" type. The windlass, steering gear and bilge pump are all driven by G.E.C. motors.

The Equipment of the "Lectro"

The *Lectro* is similar in many respects to, but rather more powerful than, the *Acklam Cross*, although she is a smaller vessel. Built by Henry Robb, Ltd., of Leith, for the Union Lighterage Co., Ltd., London, she is the first Thames tug to have Diesel-electric machinery, and she will be mainly engaged in the towing of petrol barges from Shell Haven to Fulham.

The electrical equipment was supplied by the British Thomson-Houston Co., Ltd. The *Lectro* is 92 ft. in length, 22 ft. in breadth, with a depth of 11 ft. 6 in., and she has been constructed under Lloyd's Register special survey to obtain their highest certificate for the intended service. The propelling machinery comprises two 360-h.p., 300-r.p.m., six-cylinder airless-injection engines, constructed by Mirrlees, Bickerton & Day, Ltd. The cylinders are 12½ in. in diameter, the piston stroke being 19 in. and the engines are started by compressed air supplied at a pressure of 350 lb. per sq. in. from a two-stage Reavell compressor driven by a 5-h.p. motor.

Each engine drives a 250-V d.c. compound-wound generator of a combined capacity to supply the full power requirements of the propeller motor. The main generator shaft is extended



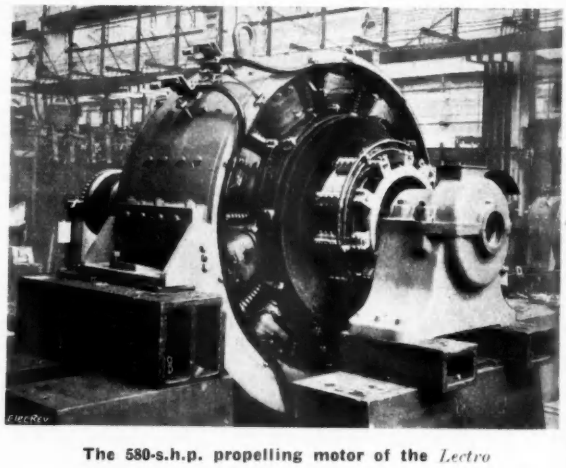
The *Lectro* switchboard; left, the propulsion panel; right, the auxiliary and distribution panels

at the commutator end to carry the armature of the overhung 20-kW, 220-V compound-wound auxiliary generator which supplies auxiliary power and lighting. The propelling motor is of the single-armature type, and, when supplied with current at 500 V, develops its full power of 580 s.h.p. at 120 r.p.m. when towing or at 150 r.p.m. when running free. To permit of convenient access to any field coil, the steel magnet frame is rotatable in a cradle.

Operation is on the B.T.H. controlled-current system which, it is claimed, is absolutely "mistake-proof." Bridge control is provided, a pedestal of the standard bridge telegraph pattern being fitted on each side of the bridge, the two being mechanically coupled together. The handles of the telegraphs can be thrown from full ahead to full astern and the equipment will respond without overloading the Diesel engines. Moreover, with this system it is impossible to overload the propelling equipment should the propeller stall due to fouling a rope or other obstruction, while, on the other hand, should the propeller be dropped from its shaft, no excessive speed is reached by the propeller motor.

The switchboard consists of two panels made of ebony "Sindanyo," the propulsion section being of the "dead-front" type. On this section provision has been made to enable the tug to run at half power with only one engine in service; the vessel can also be manœuvred from the engine room, the hand-wheel provided on this panel being mechanically interlocked with the bridge controls. The remainder of the switchboard contains the controls and instruments for the two 20-kW auxiliary generators, and for a small 5-kW independently driven generator, together with the switchgear for the steering gear, salvage pump, bilge pump motors and the lighting circuits. The independent generator is driven by a two-cylinder 18-h.p., 1,000 r.p.m. "National" Diesel engine, which also drives a small auxiliary air compressor through a clutch.

The *Lectro* is provided with a vertical-spindle salvage pump having a capacity of 90 tons of sea water per hour against a total head of 100 ft., driven by a 20-h.p. motor. There is also a bilge pump driven by a 3-h.p. motor, and a fuel-transfer



The 580-s.h.p. propelling motor of the *Lectro*

pump with a 2½-h.p. motor; for operating the steering gear there is a motor of 6 h.p. All the motors are of B.T.H. make. The main engines drive their own cooling water pumps.

Storage Heating with Automatic Control

WITH a view to demonstrating the economy of heating rooms electricity by thermal storage stoves connected during off-peak hours and subject to thermostatic control, L. Béra presents, in *Revue Générale de l'Electricité*, data concerning two suites in a Paris building. The two suites are one above the other, with a private staircase; each contains five rooms of 17,650-cu. ft. capacity. The full installation consists of twelve thermal storage stoves rated at 35 kW, but only eight stoves, of 16-kW total capacity, were used last winter. Thermostatic control effects 20 to 35 per cent. reduction in consumpjtion compared with manual regulation, but does not rule out the possibility of hand adjustment to obtain more or less heating as desired. Autographic records show that the temperature in the lower suite (reception rooms) is kept practically constant at 64 deg. F. and in the upper suite (bedrooms) at 59 deg. F., while the outdoor temperature ranges from about 50 to 23 deg. F. The total consumption of the eight stoves (16 kW) during twenty-three weeks from the beginning of November to early April was 12,340 kWh, the weekly consumption being 90 kWh for the first week, 63 kWh for the twenty-third week, and 1,000 kWh for the middle week of February. To keep the upper suite also at 64 deg. F. an extra 4 kW of stove capacity would be needed, increasing the consumption by about 3,000 kWh for the period considered. About 1,000 kWh should be added to allow for autumn and spring heating, and about 1,660 kWh for heating kitchens (not heated in the trial installation).

Finally, the winter of 1932-33 was rather mild. The net effect of all these allowances is that the heating of a five-room flat of about 19,000 cu. ft. capacity requires about 0.57 kWh per cu. ft. for the whole heating season under normal Parisian conditions of climate.

British Engineers in China. By C. A. Middleton Smith

The development of new industries

At the Economic Conference, and afterwards, Mr. T. V. Soong, Finance Minister of China, has spoken of the coming industrialisation of his country and the Lytton Report brought China into the limelight of international politics. In 1931 the British Government sent out to China an economic mission whose report is worth reading by every engineer, as it emphasises the great opportunity for engineering development there.

British pioneers in China opened up foreign trade; British engineers built most of the railways; British firms initiated and carried on the coastal steamship services. The British transformed Hong Kong from an island with about 5,000 inhabitants—mostly pirates—in 1841 to a great centre of shipping, with large dockyards and a population of about a million some ninety years later.

In Shanghai the British also did the pioneer work. They initated an industrial city—now called the International Settlement—and created an administration separate from the native city. Statistics from the Shanghai Power Company show the city's development as an industrial centre. The kWh sold (in millions) grew from 8 in 1911 to 205 in 1921, and to 600 in 1931. In Canton the output (in millions of kWh) was 14 in 1922, 51 in 1928, and 68.5 in 1932. In the district around Canton a large number of heavy-oil engines have been erected in stations for generating electrical energy in the last few years.

I am convinced from my recent visits to the cities of Shanghai, Canton and Tientsin, and an experience of about twenty years in the Far East, that the era of mass production has begun in this part of the world. In Shanghai there are about 1,800 factories, mostly outside the foreign settlements. There are already a quarter of a million factory workers, 56 per cent. of whom are women and 10 per cent. children. Besides the modern textile mills there are large flour mills, tobacco factories, engineering works, paper manufacturing plants and other industrial establishments using electric power. Nearly 3,000 hands are employed in making matches in Shanghai. In one up-to-date factory fewer than one hundred people were seen producing, with the aid of automatic machinery, nearly a quarter of a million boxes of matches a day. The approach by river to Shanghai is not unlike the approach by the Thames to London, there being factories on both banks.

[North End Studio, Portsmouth

Mr. C. A. Middleton Smith, M.Sc., M.I.Mech.E., is Taikoo Professor of Engineering in the University of Hong Kong

Authorities on the subject say that in 1914 China was approximately in the industrial position of Japan in 1900. Until recently China had failed to proceed as did Japan, but there is now a definite move forward. The increased tariffs have had their effect.

Essentials to Industrial Progress

The possibility and progress of modern industry (involving the use of machinery) depends on four things. One is the habit of mind of the population, especially the leaders; unless the educated classes of China understand something about machinery, it is not likely that it will be used to the full extent. The second essential is a government which can guarantee life and property and enforce its laws. Since the political revolution of 1912 there has been no real security in the interior of China.

The third condition is sufficient sources of energy and material for the industrial transformation. The Council on Foreign Relations, New York, has published an interesting report ("Ores and Industry in the Far East") in which it is stated that "the coal reserve of China, then, would be somewhat larger than that of post-war Germany, 163,516 million tons, but far below that of Canada, 819,465 million tons. That is sufficient to furnish power for industrialisation, but if China is going to use it with the same liberality per capita that the nations of Western Europe and North America have done, then clearly she has not a coal reserve sufficient for any very long time future. On the basis of the same per capita consumption as now obtains in the United States, the Chinese reserve as estimated to-day would last 100 years, the Japanese twenty-six years, the American 6,230 years."

At present the average figure for the annual per capita coal consumption in forty-two Chinese cities is given as 0.32 ton; the highest for any one city is 1.3 tons. This highest figure is only a little beyond the figure of the coal consumed in the United States for domestic heating alone. The report states that "the Far East was found to be generally deficient in minerals. The major exception to the rule was the abundance of coal in China."

China is a land of big rivers—the Yellow River in the North, the Yang-Tze-Kiang in the centre, and the West River in the South, and, given expert designers and the finance needed, very large sums of money could be used profitably to convert some of the energy of these rivers into electricity.

The Treaty Ports

Modern ideas about industrial development have spread rapidly during the last ten years. There are, it is said, 255 Chinese engineering students in America studying economics, law, medicine, &c. There is also a number of young Chinese in Europe. It has been stated that Great Britain is not popular for the purpose, and that lately the numbers have declined. In recent years Chinese engineering graduates from the British University of Hong Kong have been accepted by progressive engineering firms in Great Britain as graduate-apprentices. In addition, nine other gradutes of technical (Chinese) colleges are on their way to England under the Boxer Indemnity scheme to obtain practical experience.

In 1918 there were twenty-five members of the American section of the Chinese Engineering Society. In 1930 there were about 500 members of that section, and the numbers have since increased. In Shanghai, at the Nanyang College and St. John's University, European lecturers have been instructing young Chinese in scientific subjects. In Hong Kong the University has attracted students from places as far apart as Penang and Peking. In Canton, Peking and other places technical instruction has been given. In addition to the influence of that type of instruction there has been the effect of the home-coming of hundreds or thousands of overseas Chinese, many of them as (dollar) millionaires.

What has been the result? These modern ideas have been impressed on the imagination of the young Chinese. They found little or no outlet for any creative energy in their own country. That caused a sense of exasperation so that they have demanded changes. These changes are now taking place rapidly. The demand for engineering graduates of Hong Kong now exceeds the supply.

The speeches of Mr. T. V. Soong when in England show that the new type of Chinese official is anxious to accelerate the industrial development of China. The hindrances are the difficulty of maintaining law and order in certain parts of the country and the attitude of Chinese officials towards foreign investors. These officials do not realise the necessity of expert advice on technical matters, which at present can only be given by foreigners.

Meanwhile there has been good government, the modern outlook, and transport (by water) in Hong Kong and the Treaty Ports. It is in these places, especially in Shanghai, that the industrial development has taken place. The interior of the huge land of China is practically untouched by modern commerce and industry. Incidentally, the wealthy Chinese from abroad settle down in those places under European control.

Technical Education

How can we make the educated classes of China understand something about machinery? There is only one way—it is by increasing the facilities for technical education; it is also essential that British engineering firms should co-operate by encouraging well-qualified Chinese engineering graduates to enter their works for practical experience.

The Federation of British Industries, in consultation with the Universities' China Committee and the China Association in London, has arranged a scheme of student apprenticeships to enable graduates in engineering from Chinese universities to take a course of practical training in engineering shops in England. A limited number of full maintenance scholarships will be awarded each year to suitable students unable to defray their own expenses. These scholarships are financed (1) by a grant from the Universities' China Committee in London, and (2) by a regular allowance of £3 per week during training and reasonable travelling expenses to and from China.

At present there are three distinct schemes to arrange for Chinese graduate-apprentices to obtain practical experience in engineering works in Great Britain. It is in the hope of

securing co-ordination that I make the following suggestions. The three schemes are: 1. One initiated by the Board of the Faculty of Engineering of the Hong Kong University in 1920. At present there are six Hong Kong University graduate-apprentices in England who have been placed by direct negotiations between Hong Kong University and the firms concerned. 2. A scheme, initiated by Messrs. A. Holt and the Liverpool China Society, to extend scheme (1) to include technical graduates of Chinese Universities. 3. The scheme under the auspices of the F.B.I. and the China Association (London) for any Chinese technical graduates. (Hong Kong University graduates appear to be eligible under this scheme). A sum (? annual) of £500 has been granted to help finance Chinese graduates in English works selected under this scheme.

Having spent twenty-one years with Chinese students, from all parts of China, in Hong Kong, I suggest that in any of these schemes careful selection of the graduates is essential. The qualifications required of candidates may be grouped as follows: (a) Knowledge of English; (b) knowledge of mechanical or (heavy) electrical engineering; (c) good physique; (d) contact with British people; and (e) social connections in China.

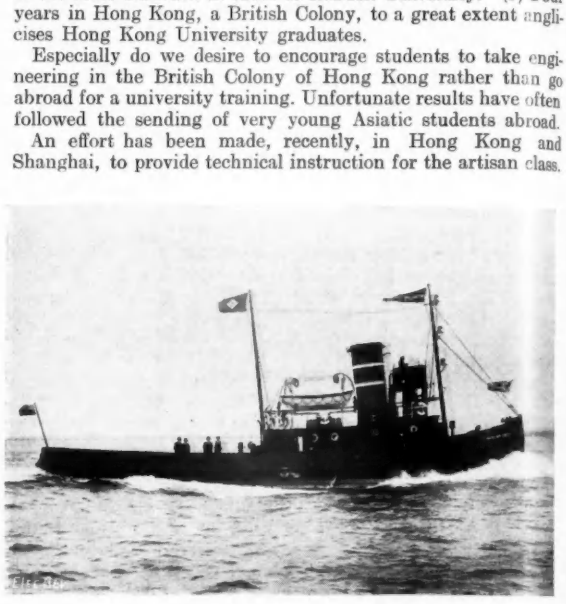
Although the co-operation of the British in China and in Britain with the British Hong Kong University authorities is most desirable, it is realised that graduates of Chinese Universities must be considered as candidates for schemes (1) and (3). but there is a grave danger that such candidates may fail in qualifications (a), (b) and (d). It may be practicable to arrange for such candidates to spend a year or more in Hong Kong University on a special course as a preliminary to spending two years in England.

Advantages in Hong Kong

I would take this opportunity to emphasise the very great need of recruiting Chinese to study mechanical or (heavy) electrical engineering in the British University in Hong Kong, especially students from Central and North China. The advantages of Hong Kong University engineering training over Chinese technical institutions are: (1) Four years' residence in Hong Kong University with a staff of twenty-eight British ensures a good working knowledge of the English language. (2) Hong Kong University engineering course and degrees are of the same standard as those of London University. (3) Four years in Hong Kong, a British Colony, to a great extent anglicises Hong Kong University graduates.

Especially do we desire to encourage students to take engineering in the British Colony of Hong Kong rather than go abroad for a university training. Unfortunate results have often followed the sending of very young Asiatic students abroad.

An effort has been made, recently, in Hong Kong and Shanghai, to provide technical instruction for the artisan class.



The *Acklam Cross*, one of the Diesel-electric tugs described on page 549

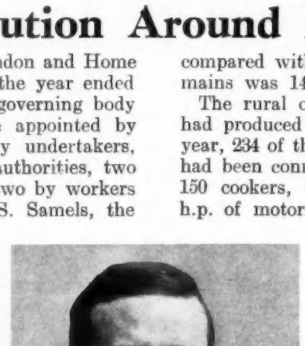
The Chinese workman is cheerful, industrious and skilful, but he needs to be taught how to use and care for modern tools and machinery. British engineers in China take a great interest in efforts made to train Chinese of all classes in engineering work, for they realise that the industrialisation of the country involves the purchase of a great deal of machinery from other countries.

Distribution Around London

THE Report of the Proceedings of the London and Home Counties Joint Electricity Authority for the year ended March 31st, 1933, has been issued. The governing body consists of thirty-six members; fourteen are appointed by local authority undertakers, five by company undertakers, thirteen by county councils and other local authorities, two by the Railway Companies' Association, and two by workers in the industry. The chairman is Ald. B. S. Samels, the chief engineer Mr. F. W. Purse, and the clerk and solicitor Mr. Leslie Gordon.

The maximum borrowing powers under the Order of 1925 are for £7 million. The total capital expenditure at the end of the period was £2,850,200, of which £2,719,996 had been spent on distribution. The total administrative expenses were estimated at £19,100, of which £5,000 was raised by precept, over £2,000 less than in the previous year.

There are six local distribution areas. In the Mid-Surrey (No. 3) Area the statutory powers of eleven undertakings were transferred to the Authority. The six undertakings administered by the Authority—Surbiton, Twickenham, Sutton, Dorking, Leatherhead, and Weybridge—supply an area of 121,500 acres with a population of 310,300; the first two and part of Sutton are within the "inner zone," and the remainder within the "outer zone." Reductions were made in tariffs in the Sutton area to the extent of £10,000, and £15,000 in the other areas.



[Haines

Mr. F. W. Purse, chief engineer of the London and Home Counties J.E.A.

Flat rates for lighting have been standardised at 5d. per kWh in the inner zone, and at 6d. in the outer zone. The two-part tariff, based upon floor area, includes a running charge of ½d. per kWh in the summer and ¾d. in the winter for the inner zone, and ¾d. and 1d., respectively, for the outer zone. Nearly 12,500 consumers out of 60,000 have adopted the two-part tariff; 1,575 cookers (at quarterly rentals varying from 4s. to 15s.), ten wash-boilers, five water heaters, 295 irons, and 1,228 kettles were out on hire.

More than 5,200 of the consumers have assisted-wiring installations, which were put in by registered contractors. The number of street lamps converted from gas was 5,212, compared with 2,154 in the preceding year. The mileage of mains was 148.

The rural overhead distribution scheme south of Dorking had produced 683 applications by the end of August of this year, 234 of these were for assisted wiring, and 472 consumers had been connected. Applications had also been received for 150 cookers, four water heaters, four wash-boilers, and 7 h.p. of motors; 100 cookers had been connected. A change over from d.c. 240 V to a.c. 230 V is in progress in Dorking, Esher, and other places. The voltage variation permitted (for three years) is five per cent. above or below the declared pressure.

The six undertakings named above sent out between them fifty-one million kWh (an increase of 21 per cent.); the maximum demand was 21,000, the kW connected 92,000 (28 per cent. increase), and the number of consumers 60,000 (21 per cent. increase). The Authority also operates the stations owned by eighteen undertakings generating 197 million kWh.

The expenditure on revenue account in the local distribution areas amounted to £153,184 (after deducting operating expenses recorded under bulk supply agreements). Generation cost £35,191 (including £17,129 for fuel), purchased electricity £60,977, distribution and public lighting £24,718, rents and rates £21,255, and management £32,081. The balance on net revenue account was £14,816. During the year the J.E.A. adopted a system of continuous reading of meters; the lag of revenue due to this (£44,000) has not been provided for in the accounts.

The total kWh generated in the whole of the London and Home Counties' District was 3,028 million. New plant sanctioned in 1932-33 included the 105,000-kW set at Battersea, 10,000 kW at Willesden, 7,500 kW at Brimsdown "A," and 7,500 kW at Wimbledon. Approval was also given to the installation of two 5,000-kVA transformers by Woolwich Borough Council for giving a bulk supply to Bexley U.D.C. The Egham and Staines Co. secured consent to standardise its a.c. voltage, and St. Pancras Borough Council to change-over from d.c. to a.c. at standard voltage.

The Dairy Exhibition

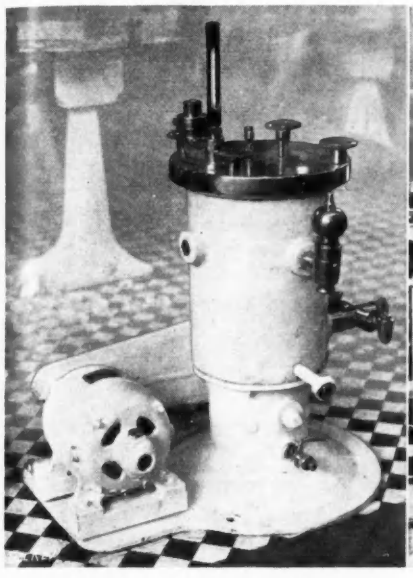
MANY manufacturers who reported at the Dairy Show only a very few years ago—"Of course, our machines can also be electrically driven," said at the Agricultural Hall this week: "We can supply non-electric drives should customers especially want them." The swift development is also illustrated by the commonplace electric drives of all types of bottle-filling and treating equipment, and the big increase in electrical equipment for milking, sterilising and cooling.

Messrs. Gascoignes (Reading), Ltd., told us that 75 per cent. of the milking equipment that they now supply is operated electrically, and that the modern method enables the manufacturer to give better service. The low consumption of electric milking equipment is exemplified by the latest development of the Alfa-Laval Co., Ltd.; a small pump unit bracketed on the wall employs only a 1/5-h.p. motor, but it will serve for five or six cows. There is also a tendency towards small self-contained equipment for pasteurising. Messrs. George S. Clayton, Ltd., have such a set served by a ½-h.p. motor (up to 600 gal. per hour). Among the larger pasteurising equipment may be seen some unusual speed reductions. A ¼-h.p. agitation motor on an equipment shown by Creamery Package Co. is actually bracketed to the lid and drives through a reduction gear box with a ratio of 1,725 to 228 r.p.m., while the "Econom" pasteuriser exhibited by Messrs. Barford Perkins, Ltd., has a 1,425 to 30 r.p.m. reduction (⅓ h.p.).

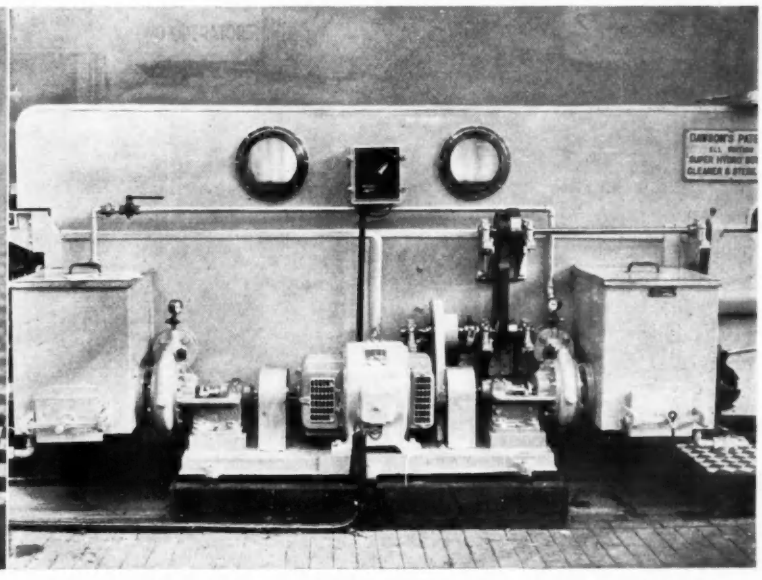
The small power behind various classes of bottling, washing, filling, and sealing equipment is remarkable. A filling and capping machine shown by Auto-Dairy Pioneers, Ltd., has only a ¼-h.p. motor and will deal with 2,000 bottles per hour. A single unit aluminium capping machine which will cope with any hand-feeding speed has a ¼-h.p. motor, while a 16-head automatic filler which will deal with 4,000 bottles per hour has a 1-h.p. motor. A cream filler served by a ¼-h.p. motor will fill 1,500 8-oz. cuplets per hour. There is a Creamery Package Co. 1,400-bottle per hour washer with a 2-h.p. motor for both the conveyor and pumps.

Messrs. R. W. Webster & Co., Ltd., are showing a crowner for 100 bottles per minute with a ½-h.p. motor, as well as a good example of a medium-size bottle-washing equipment (6,300 bottles per hour, 1½-h.p. motor for washing and 1 h.p. for the conveyor). A washing and sterilising machine shown by Messrs. Farrow & Jackson, Ltd., has a 3-h.p. motor and a capacity of 2,000 bottles per hour; an automatic vacuum filling machine with a 1-h.p. motor for 10½ gross bottles per hour; and a crown corking machine for 200 bottles per hour with a 1-h.p. motor.

An aluminium capping machine displayed by Alka, Ltd., has a capacity of 3,000 bottles per hour, and a ½-h.p. motor. On the stand of the British Miller Hydro Co., Ltd., we saw a grade A washer for 1,500 bottles per hour with a 5-h.p. drive for both the caustic pump and conveyor. Typical of the driving arrangements for large multiple washing, filling, and capping machines is one shown by Messrs. Dawson Bros., Ltd. It has a capability of 300 gal. per hour, and a 10-h.p. motor directly drives a pump on each end of the shaft and the conveyor system through a self-contained counter-shaft. Auto Dairy Pioneers, Ltd., are showing a self-elevating 500-gal. per hour milk cleaner driven by a 2½-h.p. motor; warmed milk is cleaned by centrifugal force and then elevated to the milk heater for pasteurising. Self-contained cream separators are among an extensive range of equipment shown by Messrs. R. A. Lister Co., Ltd.

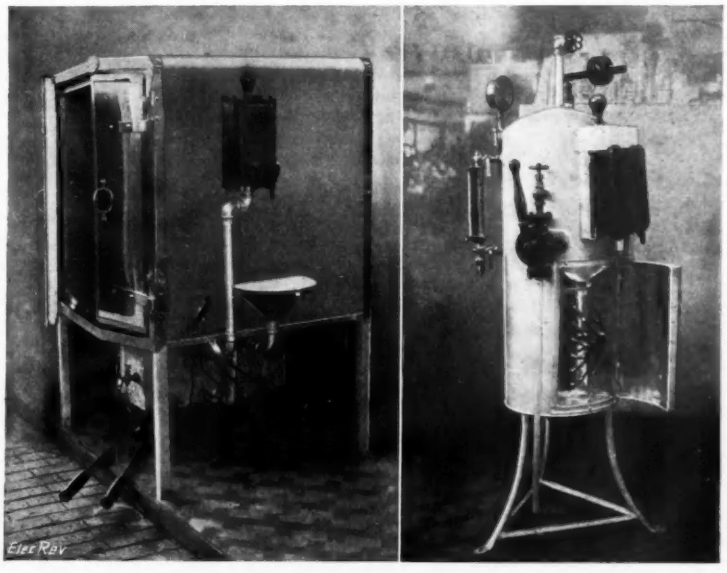


A small self-contained pasteurising unit (George S. Clayton, Ltd.)

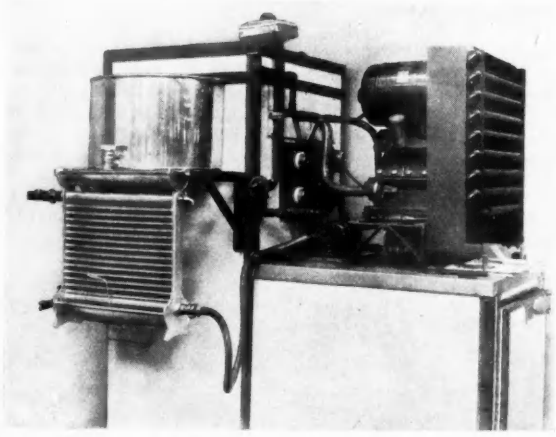


Driving arrangements for a 300-gal. per hour washing, filling and capping machine (Dawson Bros., Ltd.)

Self-contained electrically driven brush bottle-washing machines are plentiful. One supplied by Hill's of Hull, can be bolted to any bench or tank; a similar unit is exhibited by Gillings & Son. The "Paragon," shown by Cocks & Sons, will deal with all sizes of bottles, both inside and out, without changing the brushes, as will similar units supplied by the Dairy Outfit Co., Ltd., and Messrs. Barford & Perkins, Ltd. A sterilising cabinet manufactured by the last-mentioned company, with G.E.C. electrical equipment, is a typical example of this new development. The "Reform" sterilising outfit introduced by Messrs. Boucher-Giles & Co., Ltd., has a 3-ft. cube cabinet and is equipped with four automatic immersers,



A 3-ft cube sterilising cabinet and a 9-kW high-pressure boiler (Boucher-Giles & Co., Ltd.)



Self-contained milk-cooling plant and cold room (U.D. Engineering Co., Ltd.)

with an overall loading of 6 kW, and an indicating pilot light.

A high-pressure boiler by the same company is 5 ft. 6 in. high, 12 in. in diameter, holds 6 gallons, and operates at 50 lb. per sq. in. Its six immersion heaters are loaded at 9 kW (total). Among the self-contained cooling plants, one shown by the U.D. Engineering Co., Ltd., has the complete motor-driven compressor refrigerating unit mounted on a 12-cu. ft. cold room.

Obviously, the advantages of the electric delivery van are becoming increasingly realised. A van displayed by Mr. P. W. Taylor was built by the Metropolitan-Vickers Electrical Co., Ltd., and the compactness of the motor was stressed (about 12 in. diameter and 12 in. long). The respective positions of the batteries on three vehicles shown by General Vehicles Co., Ltd., are at the side, behind the seat, and under a bonnet. A steering wheel in the vertical plane is a feature of one vehicle, and the van with forward control has an entrance from the front, and can run at eighteen miles per hour. A feature of a chassis exhibited by Electricars, Ltd., is the special centre-axle gear drive.

Curfew Electric Heaters are showing four sizes of incubators. A 100-egg equipment consumes 1 kWh per day, and a 2,000-egg cabinet consumes 7½ kWh per day. The popular 1,000-egg cabinet consumes 3½ kWh on the heater and 1½ kWh on the fan. Tier brooders consume 0.4 kWh per chick for six weeks' brooding. We saw displayed by Youngs of Horley, an incubator with a capacity as great as 12,000 eggs. A recent development by Alfred Herbert, Ltd., is a "Hudson Rearmor" tier brooder equipped for electric heating and automatic temperature control. An all-electric egg cleaner is shown by Messrs. Cope & Cope, Ltd., and egg graders are displayed by Messrs. Brecknell, Munro & Rogers (1928), Ltd. The show closes to-morrow (Saturday).

10/12-cwt. van produced by the Metropolitan-Vickers Electrical Co., Ltd., and displayed by Mr. P. W. Taylor

The Motor Show

AMONG the exhibitors at the twenty-sixth annual international Motor Exhibition at Olympia (October 12th to 21st) are the following:—

The Chloride Electrical Storage Co., Ltd, is displaying "Exide" accumulators for engine starting, lighting, ignition, and all accessory requirements. The "Monobloc," with its moulded multi-compartment containers, is designed either for running-board or chassis fitting, and the "Double Life" battery's extra insulation between plates enables it to carry a two-year unconditional guarantee.

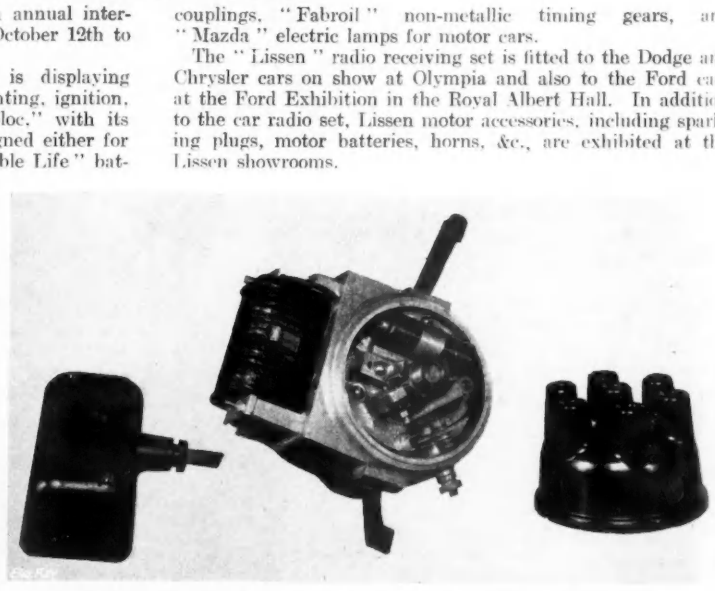
Fredk. J. Gordon & Co., Ltd., exhibit "Hobart" battery-charging and test benches; "Robot" motor-generators, valve rectifiers, and switchboards; "Van Dora" electric tools; "Gordon" welding outfits, battery shop tools, armature testers, growlers, and pullers.

Tangyes, Ltd., include a range of air compressors of modified design, and car-washing pumps in their exhibits. Also oil engine sets for power and lighting, 2.5-, 4-, and 6-b.h.p. two-stroke models, and a V.C.1 four-stroke vertical engine directly coupled to a generator.

The Hoffmann Manufacturing Co., Ltd., has produced what it describes as the smallest steel balls in the world. They are one sixty-fourth of an inch in diameter and carry the company's usual guarantee of being within one ten-thousandth inch of standard both for size and sphericity. One and three-quarter millions of them weigh a pound, and they have been produced on a commercial basis in response to a demand, not as a "stunt." The difficulties of fabricating such a tiny product can best be left to the imagination.

The British Thomson-Houston Co., Ltd., shows magnetos of the rotating armature, rotating magnet, and polar inductor types for engines with from two to twelve cylinders. New developments are the coil ignition replacement magneto types "J4" and "J6" for four- and six-cylinder engines. They are of the rotating magnet type and are interchangeable with the standard distributor head, the mountings being identical. All parts, including the armature winding, are easily accessible, and an oil bath timing governor is fitted. Other exhibits include coil ignition sets, replacement coils, automatic ignition timing devices, impulse starters, flexible couplings, "Fabroil" non-metallic timing gears, and "Mazda" electric lamps for motor cars.

The "Lissen" radio receiving set is fitted to the Dodge and Chrysler cars on show at Olympia and also to the Ford cars at the Ford Exhibition in the Royal Albert Hall. In addition to the car radio set, Lissen motor accessories, including sparking plugs, motor batteries, horns, &c., are exhibited at the Lissen showrooms.



Dismantled view of the B.T.-H. coil ignition replacement magneto

In the Motor Boat Section of the show at Olympia, Brooke Marine Motors, Ltd., have eight exhibits of marine engines and driving units of from 2 to 130 h.p. The two-cylinder 10/12-h.p. high-speed light Diesel and the 130-h.p. Brooke-A.E.C. six-cylinder cold-starting Diesel are fitted with electric self-starting equipment.

Electricity Supply Rifle League

As the result of matches played during September, the leaders of the Electricity Supply Rifle League are as follows:—Division 1: City "A" (10 points); division 3: K. & K. (14 points). No results are to hand of the matches in the second division.

MEETINGS AND DISCUSSIONS

Current Topics and Opinions Expressed at the Institutions

Progress in Illumination During 1933

THE annual report of the Technical Committee of the ILLUMINATING ENGINEERING SOCIETY, which was considered at a meeting in London on October 10th, states that the somewhat more confident feeling that has developed in industry has been favourable to developments in the applications of artificial light.

A new form of tubular architectural lamp is now available for standard voltages. By butting the ends together a continuous line of light is formed of uniform brightness, straight, curved, clear, frosted, or colour sprayed. Certain sign lamps for operating in series have a current by-pass which comes into operation when a filament burns out, bringing resistance into circuit which prevents overloading the remaining lamps.

High-voltage discharge sign lamps have been used for decorative illumination, and colour mixing is now possible. But the most important development has been in connection with hot-cathode discharge lamps. They operate directly off a.c. mains at standard voltages and the efficiency of light production is from twice to four times that of the usual combination of gasfilled filament lamp and colour filter. Several colours are obtainable for flood-lighting. The sodium-vapour lamp has been applied to street lighting as has also the high-pressure mercury vapour lamp.

Manufacturers of fittings seem to have focused attention on improving the quality of glassware. Semi-fused silica, "Vitreosil," globes and bowls of much larger size and distinctly more attractive shapes are now available, and a development of importance is the production of British flashed-opal tinted glass in sheet form. Silvered glass shop-window reflectors are now made in this country of a quality equal to, or better than, any imported.

Interior Lighting

The present demand in the home, the office, or the hospital is for clean, unpretentious, and useful form. "Fitness for purpose" is regarded as an important basis of selection. The gradual lowering of the cost of electricity has encouraged the greater use of indirect lighting. The tendency towards diffusion of light and the use of extensive areas of low luminosity has again been in evidence.

The year under review has been marked by no outstanding developments in the lighting of factories and workshops. The length of roads lighted has increased by over 100 miles in seventeen towns alone reporting to the Association of Public Lighting Engineers. A net increase of some thousands in the gas and electric public lamps in use in Great Britain has taken place.

Throughout the whole country the use of traffic-control signs has made rapid progress. Besides the manually controlled systems and flexible progressive automatic control there is now "traffic-actuated" control. Luminous traffic-control in varied forms has now been adopted very widely. In India, South Africa, and other Colonies and Dominions the method is also making headway. Recent developments have been the use of pedestrian-actuated signals and the great increase in the number of illuminated guard posts on street refuges.

Miscellaneous

The most important decision of the International Lighthouse Conference, held at the Dépôt des Phares, Paris, in July, was the acceptance of a figure of 0.2 candle at 1 km. (approximately equivalent to 0.5 candle at 1 mile) as the standard for conspicuity for marine lights, on which range tables should be based. This figure is in agreement with that generally accepted for aviation lighting.

Lighting as an advertising medium has increased more rapidly than ever during the past year; in the majority of cases neon gas has been used. Many display stands, some of them novel, have also been made for indoor service, among them a tubular lamp with a flexible filament support; the tube can be bent for the filament to follow a design.

A notable advance during the past year has been in the application of the luminous discharge tube to coloured floodlighting, and the possibilities of under-water floodlighting have been demonstrated. Experiments with the remote control of stage lighting continue, but although more elaborate control of colour-lighting has been installed in cinemas there are no reports of its use in stage plays or in the theatre.

Mr. Sully's Address

In his presidential address delivered at this meeting, Mr. C. W. Sully, director of the Electric Lamp Manufacturers' Association, used lantern slides to indicate quickly and clearly the relative applications of old and modern methods of lighting to various types of buildings. Incidentally, he mentioned that motor cars in this country are to-day utilising at least 1,000 million lumens, which is equivalent to the amount of light used in 300,000 artisans' homes. The 500 licensed aeroplanes in this country, when equipped for night flying, required on the average 600 lumens per machine.

[*Haines*

Mr. C. W. Sully, the new president of the Illuminating Engineering Society

Variations in the arrangement of the lighting source always demanded modified methods regarding the housing and application of the light obtained, and such variations were likely to continue in the future. For instance, at the present time lamp manufacturers were developing a more efficient gasfilled lamp which might alter some of the characteristics that had to be considered by the illuminating engineer.

It was now recognised that engineering *efficiency* should not rank higher than *effectiveness*. "Fitness for purpose" should be the aim of the Society. To-day, in general, it was found that "point sources" of illumination had greatly multiplied, and their noticeability greatly decreased; the tendency of the future was to obtain the required illumination from flooded areas of light, rather than from patches of concentrated light.

The president fully agreed with Sir Francis Goodenough when he affirmed that the Society could not consist entirely of "professional experts." The need of the future required the translation of lighting knowledge into practice. The membership to-day did not embrace all who had partaken in that development, and had only touched the fringe of those who, in their daily work, were responsible for advising the general public in the efficient use of illumination.

He hoped that the Society would form provincial branches, thus broadening its sphere of influence and adding to the membership many who were eminently fitted to develop its work and ideals throughout this country.

The Urgency of Domestic Electrification

EXAMINATION of the economic aspect of various unemployment relief schemes prompted Mr. J. M. Kennedy to suggest in his presidential address to the ASSOCIATION OF SUPERVISING ELECTRICAL ENGINEERS in London on October 17th that railway electrification is, comparatively, a much more productive line of capital development, although admittedly, as a straight economic issue based on no increase of traffic, it is only a paying proposition as a comprehensive scheme for the whole country at the expense of a reduction in personnel and in the total amount of coal used. Both these disadvantages are certain, however, to be outweighed to a greater or less degree by countervailing advantages.

The results on employment must, however, be viewed from a much broader standpoint. First, any comprehensive scheme would start with the suburban lines, on which no reduction of employment need be anticipated; secondly, the scheme would not be completed for fifteen or twenty years and would therefore be assisting employment continuously during this period. Thirdly, at the end of the period the numbers of the employable population should be appreciably decreasing as it is anticipated that after 1940 the population of this country will show a yearly decrease; and, fourthly, before the completion of any such scheme, the general improvement of industrial activity will have been such as to reduce unemployment to what may be called a normal level, and railway electrification itself—due to its influence on the efficiency of transport—will contribute its share in bringing about this improvement.

A very hopeful and helpful development is slum clearance—provided that the houses are built at a cost which will enable them to be let at economic rentals without any subsidy this scheme will involve no burden of charges to be met out of rates or taxes. This has potential effects on electrical development, for when houses are designed and built for all-electric equipment a definite saving can be made in capital cost as

compared with the standard cost for coal or gas fires and equipment. Can we ensure that the framers of such schemes will be able to rely on obtaining supplies of electricity in all the areas concerned on terms which will enable them to proceed with their designs in the firm conviction that not only will the capital cost be less, but also that the working expenses of tenants will be less (or no greater) with all-electric equipment than with any other means?

Although this has already been proved to be the case where suitable tariffs are in force, it is by no means universal. Could there be a stronger case for the need of co-ordination in order that we may fight with a united front and offer to the framers of these schemes a means of reducing the capital cost of construction, an ideal service to the tenants, and a certain reduction in maintenance cost on decorations? Slum clearances are to be taken in hand energetically, and some 50,000 new dwellings are to be provided annually for five years.

What is Possible

The average consumption at Brighton is about 2,000 kWh per annum at an average cost, including rentals, of 1.1d. per kWh, or 3s. 7d. per week. A large number of council houses in Liverpool have been built on the all-electric principle and the tenants are using an average of 5,500 kWh per annum at an average cost of 0.68d. per kWh. On this basis these slum clearance schemes should account for sales of an extra 500 to 1,000 million kWh for domestic purposes in the next five years, and possibly more if supplies for water heating are made available at really attractive tariffs. This alone means an increase of, say, 30 per cent. on the domestic sales in 1930-31. Mr. Kennedy stressed most strongly the need for a bold electrical policy all over the country in connection with these slum clearance schemes. He believes wholeheartedly that we can offer the inhabitants of these new houses a service which will give them cheaper, cleaner, healthier and happier homes than by any other means, and he appeals, therefore, for the immediate adoption where necessary of such tariffs and facilities as will enable these houses to be "all-electric."

The increasing use of electricity does appear to bring in its train an increase rather than a decrease of labour when everything is taken into consideration. Admittedly there will be some change in the distribution of labour, but the production, transmission, and distribution of electricity will certainly employ more direct and indirect labour than the door-to-door delivery of coal which it displaces, and it has the inherent advantage that the capital expenditure also represents more employment for plant, cables, and domestic appliances, which go on indefinitely as the cost of electricity is reduced and the number of consumers increases.

Present distribution conditions cannot remain much longer; they must either advance by voluntary effort, or give place to some new authority which will take over their powers. It would appear that there are almost insuperable difficulties in the way of voluntary schemes of co-ordination, and we must come to the conclusion that some form of Government intervention is inevitable. Sooner or later all public services, such as water, electricity, and transport, and possibly our basic industries, must come under some form of co-ordinated control. The need for a properly planned and balanced system of production and distribution has been widely recognised, and different nations, such as Italy, Germany, U.S.A., and Russia, are all trying to achieve the same result in their different ways.

[*Elliott & Fry*

Mr. J. M. Kennedy, the president of the Association of Supervising Electrical Engineers

Having in view the national advantages of electrical development, we should aim at a five-year plan to electrify all towns and villages down to, say, a minimum of 100 inhabitants, aiming at connecting up at least one million consumers a year, of whom at least 50 per cent. should be cooking electrically.

Mr. Kennedy stressed the importance of domestic electrification because he considers it urgent. The domestic demand must always continue and should be continually growing; as it grows its diversity and load factor increase, and a satisfied domestic consumer is never likely to revert to any other system, provided proper service is given. He did not, however, minimise in any way the importance of the industrial power load which is awaiting electrification.

Television in Germany

THE progress of television as illustrated at the Berlin Radio Exhibition, 1933, was outlined by Mr. E. H. Traub in a lecture he delivered at the opening meeting of the sixth session of the TELEVISION SOCIETY in London last week.

The lecturer considered that Germany was ahead of all other countries in this matter. The new Okolicsanyi light valve was, in his opinion, the greatest advance in this direction that had been achieved for many years, and the Loewe system of cathode-ray reproduction provided the nearest approach to the perfect television image that he had seen.

The "Northmet" stand at the North London Exhibition **(see page 564)**

Mr. Traub reviewed the Tekade, Telefunken, Loewe, Mihaly, and von Ardenne exhibits, and gave details of a new intermediate film type of large screen projector-receiver, and of a new type of spot-light transmitter in which the subject is totally enclosed in a tube with a high reflecting factor.

An entirely new type of mechanical receiver, invented by Mihaly and on show for the first time, had been financed and developed with the aid of an English syndicate which, said the lecturer, hoped to make that type of receiver available to the British public in due course. The German Post Office had demonstrated cathode-ray reception, but the results were somewhat inferior to those of the commercial systems.

Although one particular cathode-ray receiver gave very admirable results, mechanical receivers were at present the only ones simple and cheap enough to introduce into the home. The German Government was aiding the development of television, and doing its utmost to persuade manufacturers to place sets on the market as soon as it was technically possible to do so.

* * *

The Predominance of Solid Fuel

For his presidential address at the INSTITUTE OF FUEL in London on October 18th, Sir William J. Larke chose the subject of "Fuel and Man." He pointed out that although water power was of very great importance in certain countries where natural conditions favoured its development, as in Canada and certain parts of India, it was not an important factor at present in relation to the world production of power. In 1932 water power was responsible for only about 3 per cent. of the total world power production. Oil was responsible for 19 per cent., and coal and lignite for the balance of some 78 per cent. Therefore, despite the substantial inroads that oil had made into some markets previously served by coal, it seemed unlikely ever to replace coal or its derivatives as the important fuel on which modern civilisation was based.

* * *

Cooling-water Treatment

The treatment of cooling water for Diesel engines is dealt with in the paper by Mr. L. O. Newton, which was read before the DIESEL ENGINE USERS' ASSOCIATION in London on October 12th. It is pointed out that though the addition of chemicals during circulation may prevent the deposition of hard scale, by turning the lime and salts contained in the water to soft sludge, this sludge must be removed, otherwise the passages will soon become choked. Therefore treatment of the cooling water in accordance with its chemical analysis before it enters the jackets is the best procedure.

Correspondence

Correspondents should forward their communications as early as possible. No letter can be published unless we have the writer's name and address in our possession

The First Essential

Mr. Wilson's letter in your issue of October 6th brings to the fore a matter which has troubled many of us—the problem of prospects outside the supply radius. It is a matter which urgently requires attention without doubt, but why should its importance be used as an opportunity to deprecate the selling of electricity to those to whom it *is* available?

The completion of the grid has forced us to turn our minds to the loading of it. We can accomplish this in two ways: by increasing the demand from consumers and prospects within reach of present mains, and by extending the mains to prospects outside our present range. The former is a matter of salesmanship, the latter, one of finance. Mr. Wilson's problem is the latter, namely, finance, and he should therefore present his appeal to those in financial control only. There is no need to involve salesmanship in it at all.

That it is essential to provide mains extensions is obvious, but it is also just as essential to load those mains—and only salesmanship will bring that load. The problem then becomes, in miniature, the same as the one which the grid itself has produced. And so once more we complete the circle of success with the keyword "sales." It is, therefore, useless to extend mains without selling the product, and, similarly, to sell without extending mains is wasted effort. (With the exception that there still remains a tremendous load to be sold to present consumers.)

We on the selling side do not begrudge financial support for mains extensions. Why should Mr. Wilson begrudge us our minute expenditure? Neither side can work successfully without the other, so let us cease this habit of destructive criticism and "get on with the job."

H. H. HARTLEY.

Marlow, *October 9th.*

The Armagh showrooms of the Electricity Board for Northern Ireland **(See page 561)**

High-speed Lifts

Mr. Dummelow's article in your issue of October 6th on variable-voltage lift control systems may tend to convey the impression that Ward-Leonard speed regulation, established many years ago, has only recently found favour for "modern" lift drives. Variable-voltage control has been employed from time to time for many years, though it is only during the past four or five years that the demand for wide speed variation on lifts serving the loftiest of buildings has given makers opportunities of adopting this well-tried method more frequently.

It is unlikely that such equipments will be extensively used for several years, principally because there are a number of simpler and less costly drives which give adequate speed ratios for current demands. Mr. Dummelow prefaces his description with an example of 200-ft. high premises with sixteen storeys, but surely this is not typical of present-day practice. The London Building Act of 1930, which is followed broadly by provincial authorities also, limits heights of buildings to 100 to 120 ft. Most lift travels in "modern" buildings are approximately 70 or 80 ft., and travels exceeding 110 ft. are rare. An exception to the rule is that of the waterless type of gasholder, such as that recently erected at Battersea, which is 320 ft. high.

Lifting speed is primarily a function of the travel, and until the Building Act is drastically amended lift speeds not exceeding 350 ft. per minute, with speed ratios from 3:1 to 10:1 will remain common factors upon which lift drives and control systems are determined. This critical data is amply catered for by squirrel-cage induction motors, special two-speed slip-ring induction motors, variable-speed shunt commutator motors and shunt-regulated d.c. motors.

The variable-speed shunt commutator machine is a particularly satisfactory motor for speeds up to 350 ft. per minute, since it can be obtained to give a speed range of 10 to 1 and therefore permit of self-levelling apparatus without separate micro-drive. Moreover, its control gear is, of course, remarkably simple, irrespective of b.h.p. and its smoothness of acceleration and retardation is comparable with that of a Ward-Leonard drive. Again, employment of a single machine, instead of the three components of a Ward-Leonard installation, reduces losses considerably; there is a corresponding saving of space, and wasteful consumption of energy while the lift is not in operation is also avoided. Most architects are prepared to incorporate sound-quenching material in their motor-room designs and so brush whine, an objectionable feature of the commutator motor, need not be a drawback.

Where creeping speeds are not desired, speed ranges of 3:1 to 4:1 are satisfactory and any of the remaining types of motors mentioned above can be utilised. Some manufacturers can provide automatic self-levelling with these machines by employing a separate micro-drive gear for the purpose, coupled by magnetic clutches. For the same reason that ultra-high speeds are not yet required, except in isolated instances, worm-gear drives will not be superseded by gearless machines until the fetters of the Building Act are removed. When, ultimately, sixteen-storey buildings are generally permitted, I am of the opinion that Ward-Leonard speed control will be replaced by regulation from frequency-changing plant.

T. G. MARTIN, Grad. I.E.E.

London, W.3, *October 11th.*

The Grid System

With the completion of the British grid power stations all over the country are linked up so that in the event of a complete shut down power can still be supplied to the consumers; thus, the reliability of supply is enhanced. An efficient power station can be kept running at its most economical load. The plant capacity of a power station has averaged hitherto 160 per cent. of the maximum load, whereas about 110 per cent. is sufficient for a station connected to the grid; the commercial efficiency is therefore increased.

This desirable condition has been attained at a cost of approximately £27 million. Can this enormous expenditure of money be justified? Some engineers attempt to justify it by arguing that as the sum of the maximum demands of the stations connected to the grid is about 4 million kW, on the basis of 160 per cent. of the maximum load the plant capacity required would be 6.4 million kW, whilst on the basis of 110 per cent. the capacity would be 4.4 million kW, representing a saving of 2 million kW. Assuming a cost of £14 per kW,

the saving in money would be twenty-eight million pounds.

The economist could probably demonstrate that it will all be saved in course of time, while, to the man in the street, it would appear that electrical engineers have performed a remarkable engineering feat in painlessly extracting from the pockets of the taxpayers this vast sum of money. According to a pamphlet which has had a circulation running into many thousands, "The Central Electricity Board will shortly provide a reliable and cheap form of electrical energy in all parts of the country. New generating stations are being built in central districts where fuel and water are cheap, these being connected to other new or existing centres. The result is dependable, cheaper power, produced by a few large generating stations operating at their best efficiency instead of by numerous small, inefficient sources."

With the progress of time, the tune of the electrical engineer has changed to a minor key. He is busy discounting any knowledge of such golden prospects as cheap and abundant supplies for all. The function of the grid is merely to interconnect power stations, thereby increasing reliability and reducing generating costs. At no time was there a promise of these savings being handed on to the consumer, and the Act does not deal in any way with distribution, which is still entirely in the hands of the supply authorities.

One of the most obvious needs at the present time is a standardisation of the price per kWh. The grid has knocked the bottom out of any argument there may have been justifying such radically different charges as a halfpenny and a shilling. Power factor appears to be an obstacle in the way of a national price. The engineer should so arrange his multipart tariff that the consumer will save money by spending money on power-factor improving devices. Would a national charge per kVA be too drastic an arrangement? The ultimate effect of this would be that low power factor apparatus would disappear from the market. Some modification in the standard charge would probably be necessary in order to stimulate off-peak loads.

With the reduction in the price per kWh, coupled with skilful salesmanship, an enormous increase in the domestic use of electricity is assured. Most people see the advantages of these labour-saving devices but hesitate to install them because of the uncertainty of running costs; this is especially true of electric cookers.

At present a sub-station on the grid costs something like £46,000—a price which severely limits expansion in rural areas. What is wanted is something equivalent to screwing a small water pipe into the periphery of a water main. This could be done by supplying a motor-generator sub-station from the 132-kV lines through a special three-phase transformer with condensers in series with each line for such low powers as 600 kW or less. PROGRESS.

October 11th.

Measuring Small A.C. Voltages

While the method of measuring small a.c. voltages (described in your issue of October 6th, 1933) might conceivably be used in the absence of a suitable low-reading voltmeter, it should be realised that the voltage actually measured by the device is that component of the test voltage which is in phase with the transformer secondary current. The fact that there may be a phase difference between the test voltage and the standardising current has not been sufficiently well considered by Mr. Banner. If the phase difference is appreciable the instrument fails badly, not only by ceasing to function as a "null method" but also by giving seriously inaccurate results.

The use of the device for the measurement of voltage drop on meter current coils is a particularly ill-chosen example, and one presumes that Mr. Banner has not actually tested the instrument when used in this connection.

A typical meter current coil may drop 0.25 V and have a power factor of 0.7. Then the device will indicate a voltage of $0.25 \times 0.7 = 0.175$ V, *i.e.*, the error will be over 40 per cent. of the reading. It is perhaps fortunate that in these circumstances the sensitivity will be so low as to prevent the voltage being read with any degree of precision. In adjusting the milliammeter for minimum deflection, an uncertainty of one per cent. of the deflection, either plus or minus, corresponds to 14 per cent. in the indicated voltage.

Has Mr. Banner considered the case when the voltage to be measured is 90 deg. out of phase with the transformer secondary current? A. FELTON.

Croydon, *October 10th.*

Warming Buildings by Electricity

Mr. Lesser and the E.D.A. should exercise a little caution when offering advice to electricity salesmen. Modern automatic oil burners should not be confused with prehistoric blowlamps; further, they should remember that boilers designed for liquid fuel firing do not permit too many B.th.u.s to enter the chimney.

Having observed these facts they should readily realise that electricity, even at power rates, cannot compete with fuel oil. Let the E.D.A. study Mr. H. Wilson's words of wisdom; they should provide ample food for thought and a clear view of a field for real action. G. COPELAND.

Winchester, *October 10th.*

The Heating of Lampholders

In his letter in your issue of October 6th Mr. J. Bolt makes some sweeping remarks with regard to porcelain lampholders. Many of your readers will have long experience of Benjamin porcelain lampholders and will know that it is not "fairly safe to assume that skirts would get broken," this being a most infrequent occurrence.

The avoidance of heating of cables entering fittings is much more important than the heating of the holders themselves, as those of your readers who studied your report of the paper read at the Institution of Electrical Engineers in the spring will be aware. If the lampholder gets so hot as to distort the bakelite, then it is practically certain that the flexibles will also be overheated, and it is, *inter alia*, to reduce the temperature of cables within the limits specified by the I.E.E. in its wiring regulations that we have just introduced a new "Sunflux" system of industrial lighting equipment.

HOWARD LONG
(Benjamin Lighting Engineering Service).

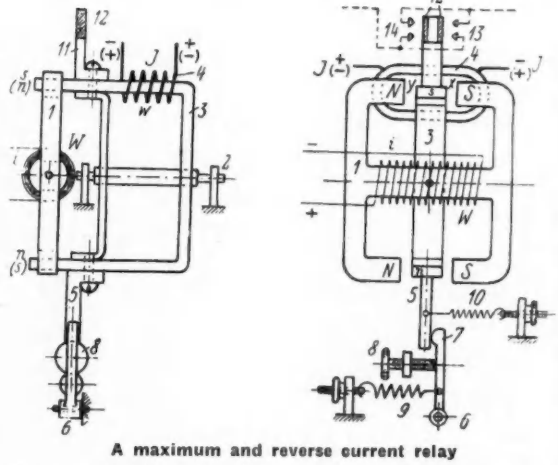
Tottenham, N.17, *October 13th.*

A New Maximum and Reverse Current Relay

THE accompanying drawings from an article by Prof. R. Edler in *Elektrotechnik und Maschinenbau* illustrate the construction and action of a new relay, which permits the sensitivity of the reverse current trip to be adjusted independently of the overload current release. The pressure coil, with W turns carrying current i, excites the magnet *1* and produces pairs of poles NS as shown. Between these poles there is the pivoted soft iron armature *3*, which can move freely inside the current coil *4*, the latter being of w turns carrying current J. The normal direction of current flow produces poles ns in *3*, as shown, hence the armature *3* turns anti-clockwise and presses the stem *5* against the lever *7*. When the current exceeds a predetermined value, depending on the adjustment of the screw *8*, the torque on *3* overcomes the spring *9*, and the contact bridge *12* is brought on to the trip contacts *14*. This is the case of current overload release.

In the event of reversal of the current J, the polarity of the armature *3* is reversed and the armature moves clockwise closing the trip contacts *13* (in parallel with *14*) directly the reverse current is sufficient to produce a torque on *3* overcoming the spring *10*. The latter can be adjusted independently of the overload spring *9*. In some cases it is preferable to omit the spring *10* and to turn back *8* so that the upper end of *3* has a bias towards the right. If, then, the current J becomes zero, the upper end of *3* is at once attracted to the nearer pole S, the gap x being shorter than y. This results in the trip contacts *13* being closed directly J=zero, without waiting for the action of reverse current.

If preferred, the magnetic system *3* can be fixed and *1* pivoted. Also, the pressure and current coils can be interchanged; or the pressure coil can be omitted, in which case its core must be replaced by a permanent magnet. This relay is said to have given good results in practice.



A maximum and reverse current relay

New Apparatus and Devices

for Domestic, Cooking and Heating, Lighting, Power and Scientific Purposes

A Small Tempering Furnace

A small vertical forced-air circulation furnace has been developed jointly by BIRMINGHAM ELECTRIC FURNACES, LTD., Birlec Works, Tyburn Road, Erdington, Birmingham, and WILD-BARFIELD ELECTRIC FURNACES, LTD., Elecfurn Works, North Road, N.7. This model is made in two types—one for temperatures up to 400 deg. C. and the other for temperatures up to 650 deg. C.—differentiated only by the design of the temperature regulator; the first is suitable for tempering carbon-steel parts, the second for the whole range of tool-room tempering of carbon and high-speed steel. The maximum rating is 4 kW, but it is claimed that only 1½ kW per hour is required to maintain the maximum temperature. To combine rapid heating with close temperature control (down to 200 deg. C.) one section of the heating elements may be cut out. The equipment includes automatic temperature control, temperature indicator, and switch panel with pilot lights. The design is similar to that of the larger furnaces of the same makers, air circulation being produced by a centrifugal fan.

A carbon-steel tempering furnace

An Automatic Immersion Heater

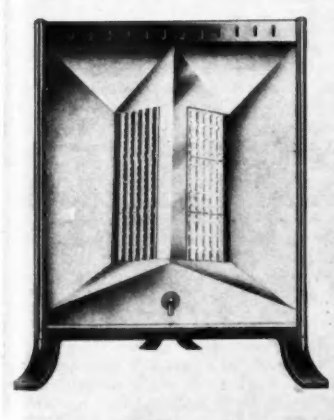
MESSRS. HERBERT BOWYER & Co., 30a, Highgate Road, N.W.5, have recently introduced a combined water-heating immersion heater and thermostat for which a very fine temperature differential is claimed by reason of the thermostat actually "breathing" with the heater blades. A positive no-water safety device is also incorporated. The thermostat embodies a mercury switch, and it will deal with currents up to 40 A, a.c. or d.c. The complete unit is available in sizes from 1 to 11 kW, at prices from £2 15s. to £9 10s. The apparatus was illustrated on p. 498 of last week's issue.

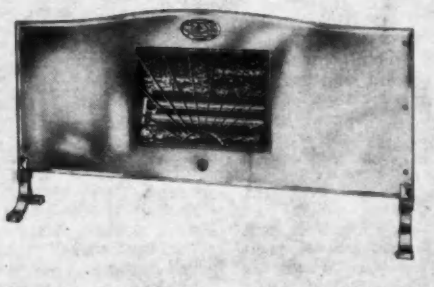
New "Ediswan" Fires

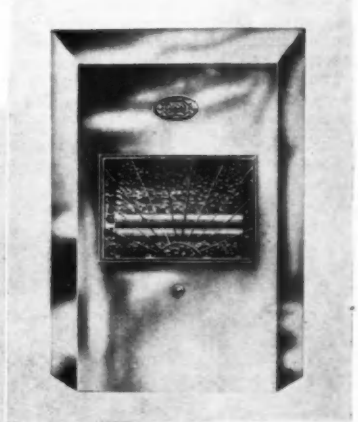
The new "Ediswan" fires show a trend towards simple modern designs and plain smooth surfaces. The "Nelson," a 2-kW model finished in chromium plate, costs £2 10s. The fire is fitted with flat bar type elements so arranged that when the fire is on circuit the glowing elements are reflected in the side panels, giving the appearance of four.

The "Palatine" and "Majestic" screen fires are identical, with two 1-kW clamp-in elements in front of a bright chromium plated hammered reflector, but the "Palatine" has an upright rectangular screen whereas the "Majestic" is much wider than it is high. The elements are protected from external damage by small radial bars.

The only other new model is a small edition of the "Victor," known as the "Little Victor." The price is £1 6s. 6d. and the fire is provided with a loading of 1 kW. One outstanding point of interest in this model is that the reflector can be tilted and fixed at any desired angle. The manufacturers are the EDISON SWAN ELECTRIC CO., LTD., 155, Charing Cross Road, W.C.2.



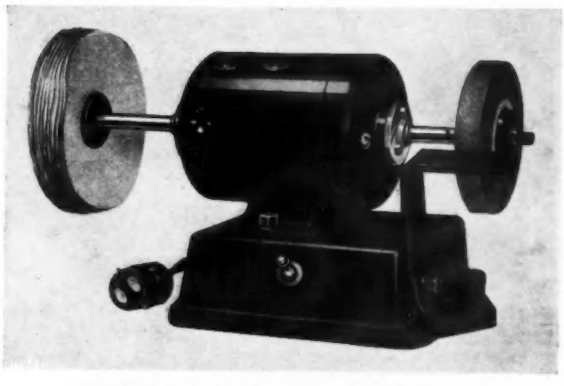




The Ediswan "Nelson," "Palatine," and "Majestic" fires

A Grinding and Polishing Unit

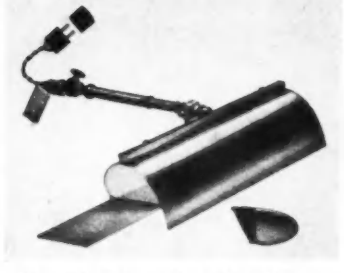
A recent addition to the range of Klaxon fractional horse-power motors is a 1/10 h.p. model fitted with a 3-in. grinding wheel and a 4-in. polishing mop. The base upon which the motor is mounted is of cast iron, and a tool rest, single-pole switch, and 4 ft. of flex fitted with a lampholder adaptor are included in the equipment, the price of which is 3 gns. The motor is of the universal type and can be wound for any voltage up to 230. The manufacturers are KLAXON, LTD., Blandford Street, W.1.



The Klaxon grinding and polishing unit

The "Whiteway" Reflector

The reflector marketed by MR. W. R. WHITE, 3, Warwick Street, Regent Street, W.1, for illuminating pictures, tapestry, mirrors, etc., has a chromium plated inner surface and a glass diffusing screen carried in channelling to simplify removal for cleaning and lamp renewal. The front edge is extended to form a lip which conceals the light source from the eye, and a smaller lip at the back cuts off light above the picture frame. The wiring is concealed in the hollow bracket arm, which is telescopic for adjustment of distance. At the bracket end is a worm and screw joint and at the reflector end a wing-nut joint, which enable the perpendicular alignment and angle of light to be adjusted.



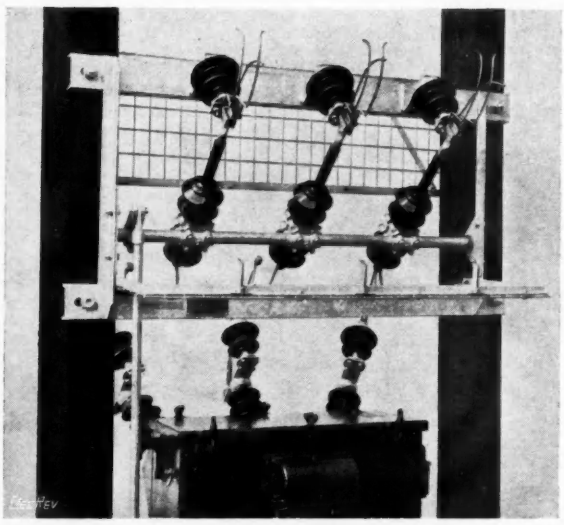
The "Whiteway" picture frame reflector

This "Whiteway" reflector provides for exceptionally easy and accurate setting, and is hand made of brass in any finish to harmonise with its surroundings. It is supplied complete with the lamp and wired at from £2 12s. 6d. to £15 for from one to six 30- or 60-W lamps, and at from £5 10s. to £11 10s. for from one to three 100-W lamps.

Pole-mounting Switchgear

The screened-type air-break switchgear illustrated on page

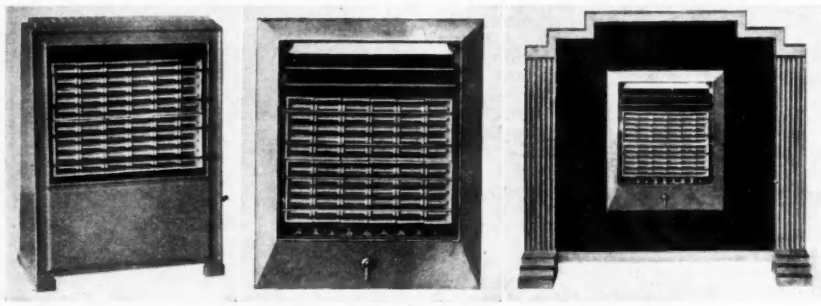
560 has been developed by the FOSTER ENGINEERING CO., LTD., Apex Works, South Wimbledon, S.W.19, for pressures up to 11 kV to comply with Home Office Regulation No. 18 (*d*). The tubular switch blades pass through porcelain to the side of the pole or poles remote from the incoming



" Foster " screened-type switchgear

live contacts. With the switch open, the fusegear and transformer equipment are simply and effectively screened from live conductors, isolating the operator on the fuse side without the necessity for increasing the pole height. The screens and contacts engaged by the opened switch can be easily earthed. All mechanical stress to which the insulators are subjected is confined to direct compression, giving a strength to the complete unit equal to that of good oil switchgear.

The equipment (which occupies only 2½ ft. of pole height) has been designed more especially for use where a main transmission line is tapped through a transformer without alteration to the existing main-line pole. Detachable fuse units for fitting direct to the transformer-terminal insulators can be supplied. The equipment can be arranged for erection on any usual type of pole structure, and three-phase switchgear for single-pole mounting is available.

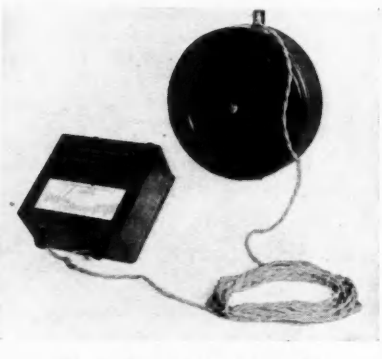


The Hart " Major," " Adaptable " and " Elwood Screen " fires

A Desk Type A.C. Ohmmeter

Motor-driven work bench ohmmeters have been in use for several years, but the RECORD ELECTRICAL CO., LTD., Atlantic Street, Broadheath, nr. Manchester, has now introduced an a.c. operated work bench ohmmeter, eliminating all the running parts, and wear and tear of generator and motor. A further advantage is a saving in cost, the constant pressure generator and driving motor not being required.

The apparatus consists of a transformer to raise the supply voltage to 500 or 1,000 and this is converted to d.c. through a Westinghouse metal rectifier, and is smoothed through condensers. The transformer, rectifier and condensers are housed in a neat case, which can be fitted in any convenient position. There is less ripple in the voltage wave than that of the usual constant pressure generator, and tests can be made on apparatus of considerable capacity or inductance. Several indicators can be supplied from one rectifying unit.

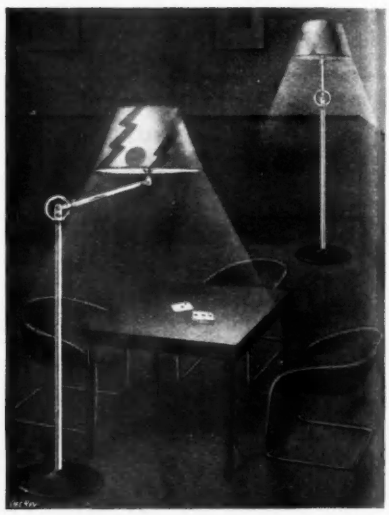


The " Record " a.c. ohmmeter

Work bench ohmmeters are supplied in different ranges, from 10 megohms up to and including 2,000 megohms, for voltages of 250, 500 or 1,000, as desired. The equipment is most useful to manufacturers who require quick and accurate insulation tests of small and numerous accessories during the process of manufacture. All that is necessary is to connect the rectifier to the a.c. supply, and the indicator to the d.c. terminals when the set is ready for use. Models can be supplied to meet the needs of varying supply voltages, testing ranges, etc.

The " Maxim " Bridge Standard

The " Maxim " floor standard is a new appliance introduced by MESSRS. CASH, WHITEHURST & CO., LTD., 85, Hatton Garden, E.C.1, incorporating a special patent adjustable bracket arm known as the " Cashlight." which enables the light to hang directly over a bridge table without being in the players' way. It can be replaced in a vertical position when required for general lighting, as shown in the accompanying illustration of the two positions.



The " Maxim " floor standard

New Hart Fires

Four new fires have made their appearance in this season's range of fires made by the HART FOUNDRY CO., Ryland Street, Birmingham. The " Minor " (25s. 6d.) and " Major " (38s. 6d.), are of similar form, but the former has one 1-kW fire-bar and the latter two. Both models are available in primrose or green vitreous enamel, and they measure 10¼ in. high by 10 in. wide by 4 in. deep, and 13¾ in. high by 10 in. wide by 4¼ in. deep, respectively. The " Minor " model weighs 8¼ lb. and the " Major " 4 lb. more.

The Hart " Adaptable " is specially designed for fixing into walls or tiled surroundings. Two 1-kW bar elements are incorporated, the switch being below them in the centre of the frame. The size is 13 in. high by 11 in. wide by 2¾ in. deep, and the weight 9 lb. In chromium-plate finish the price is £2 2s. 6d.

The same heating unit fitted into a screen finished in satin black enamel is known as the " Elwood Screen." The price of this model is £5 10s., and the measurements are 24½ in. high by 26 in. wide by 7 in. deep.

Time Switches with Special Contacts

The STANLEY ELECTRICAL CO., Latimer Works, Teddington, has recently extended its range of time switches by the introduction of 8- and 15-day models. Each of these is supplied in 2-, 6- and 12-A sizes, and all have precious-metal contacts, which, in the case of the 12-A switch, obviates the use of mercury pots. The latter switch is particularly suitable for group lighting, as, like the other switches, it is only plugged in and is therefore easily removed. All of the switches work on the same principle and are designed for simplicity of operation. They have been specially produced to include the following advantages:—Totally enclosed clock; long break; contacts locked together when the switch is on, without any strain at all on the clock, so avoiding vibration between the contact surfaces; and minimum number of moving parts. An illustration appeared in last week's issue (page 521).

Crompton " Minor " Motors

The range of Crompton " Minor " motors has been extended recently, and now covers practically every need for powers between 1/20 and 1½ h.p. To give adequate protection to these small motors, MESSRS. CROMPTON PARKINSON, LTD., offer a " safety switch " which embodies thermal and magnetic overload features, and gives adequate protection against sustained overloads, at the same time permitting the passage of the starting current. This small circuit breaker has all its mechanism enclosed in a bakelite case, which can be sealed to prevent unauthorised alteration of the settings, and costs 15s. 6d.

Electricity in Northern Ireland

THE first annual report and accounts of the Electricity Board for Northern Ireland have been issued by that authority (27, Great Victoria Street, Belfast, 1s.). The period covered is from June 1st, 1931, the date of the setting up of the Board, to December 31st, 1932.

The Board is a non-profit earning body formed under the Electricity (Supply) Act (Northern Ireland), 1931, which was based upon recommendations made by Mr. J. M. Kennedy. The members of the Board (appointed by the Minister of Commerce for two years) are Messrs. Malcolm Gordon (chairman), G. H. Muir, W. D. Scott and Major R. Stevenson. The chief engineer and manager is Mr. C. R. Westlake, and the secretary is Mr. L. McMaster. The Board is charged with the duty of promoting, co-ordinating, and improving the supply, distribution and sale of electricity—and is empowered to purchase energy at cost from selected stations, to construct transmission lines and distribution systems, to sell electricity in bulk and retail, and to acquire existing undertakings.

The first task of the Board was to prepare a scheme for the South-Eastern Area, comprising parts of the counties of Armagh, Down and Tyrone, and to select the Harbour power station of Belfast Corporation for operation. The Board has purchased the 33-kV line from Belfast to Lisburn and Lurgan and the 22-kV line from Belfast to Holywood and Bangor. By the end of December last 91¼ miles of 33-kV and 8½ miles of 11-kV overhead lines had been erected, thirty-two miles of 33-kV line were under construction, and contracts had been placed for ninety-five miles of 33-kV and 22¼ miles of 11-kV lines, all of which should be in commission by the end of this year.

With the exception of the four miles of steel towers from the Harbour power station to Rosebank and of ten miles of concrete poles still to be erected, wood poles have been used throughout. Nine spur lines have also been constructed to supply loads (chiefly industrial) off the routes of the main transmission lines. The steel towers carry four circuits, two of which are insulated for 132-kV; the 33-kV conductors are 0.1 sq. in., and the 132-kV conductors 0.15 sq. in. copper equivalent s.c.a.

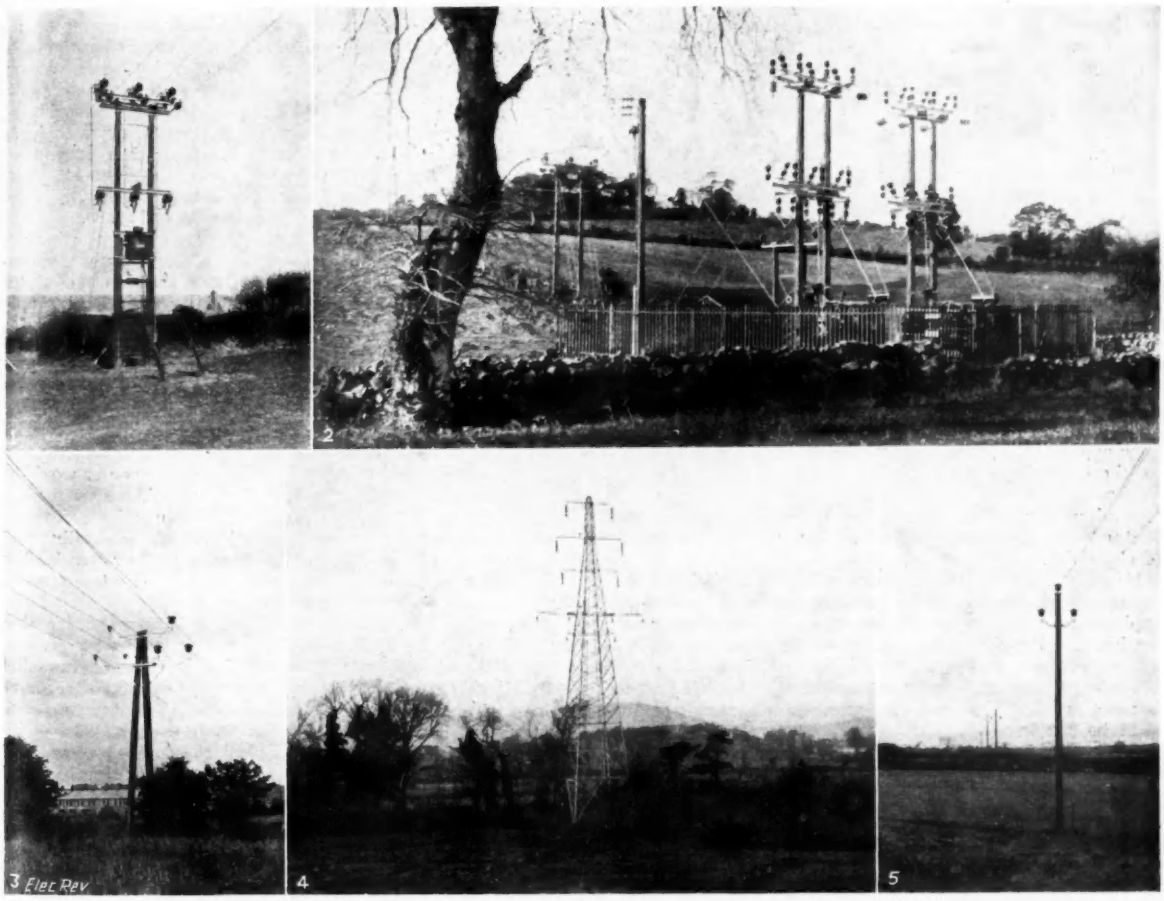
The Board acquired the undertakings of Bangor, Holywood, Lurgan, Armagh, Newry, Helen's Bay, and Omagh, and is constructing 400/230-V distribution systems in fourteen other towns and villages. It is authorised to borrow up to £1,000,000 and, subject to consent, a further £500,000. The Ministry of Finance has guaranteed the payment of principal and interest on borrowings up to £500,000.

Operations during the nineteen months covered in the report were financed by bank loans of £175,000; the Board is also responsible for loans of £135,413 in connection with undertakings acquired. The total capital expenditure at December 31st, 1932, was about £388,000, allocated as follows: Land and buildings, £17,000; h.v. transmission, £169,000; l.v. distribution, £143,000; machinery and instruments, £26,000; transport fixtures and sundry, £33,000. The balance sheet shows a debit of £6,658, with liabilities of £429,491.

The number of kWh sold increased from 1,681,000 in 1931 to 2,548,000 in 1932, but the load factor fell from 21.5 to 17.9 per cent. The number of consumers, 3,666, represented an increase of 31 per cent. over the 1931 figures. Energy purchased (2,956,000 kWh) from Belfast Corporation cost £11,741, of which fuel accounted for £1,053. (The tariff works out at approximately £5 per kW and 0.186d. per kWh.)

A sales organisation is being developed with a view to enabling consumers to call upon the services of the staff for advice regarding the installation and utilisation of electricity; advantage is being taken of these facilities by consumers. Several large industrial consumers have recently been connected. The two-part tariff for domestic purposes comprises a fixed charge (varying from £1 11s. 3d. per annum for a house having a floor area of 500 sq. ft. to £10 for 6,000 sq. ft., all above being charged at 0.4d. per sq. ft.) and a secondary charge of ¾d. per kWh for the first 2,000 kWh per annum (600 in winter quarters and 400 in summer quarters), and ½d. per kWh for all in excess. For hotels, schools and institutions the fixed charge is 1d. per sq. ft. of floor area. Out of a total of 3,666 consumers, 1,485 had adopted the two-part tariff.

The combined average price per kWh sold for six of the larger undertakings in 1931 before acquisition was 3.66d. per kWh, whereas the average price obtained by the Board throughout its entire area in 1932 was 2.76d. per kWh.



Parts of the Northern Ireland System

1. A pole-mounted transformer at Groomsport. 2. Sub-station and h.p. junction point, Magheralave. 3. A double-circuit h.p. line near Newtownards, Co. Down. 4. A steel-tower h.p. line at Castlereagh, Belfast. 5. A single-circuit h.p. line near Comber, Co. Down

The Grid and the Small Contractor. By F. D. Parker

Closer collaboration with electricity suppliers is essential

THE closing down of a number of generating stations owing to the completion of the grid will mean that many municipalities will be devoting increased attention to distribution and related developments in their areas. The question of municipal trading becomes once again vitally important in the electricity supply industry.

The position of local electrical contracting presents problems which did not exist a few years ago when contractors were only required to stock small electrical accessories, lamps, &c., necessitating a minimum capital outlay. Rigid wiring rules and regulations were not general, and contractors were comparatively free to follow out their own ideas in installation work.

Radical changes have been brought about by the increased domestic use of electricity, such as cooking, space and water heating, and lighting. There is intense competition, modern sales methods and advertising have been introduced, and the cost of wiring and appliances has so limited certain forms of development that the outlook and business of supply authorities have been transformed.

Hire-purchase of apparatus, assisted wiring, and simple hiring schemes are general, and supply authorities are conducting contracting departments at a profit. The number of these departments has become so large as to threaten the existence of small private contractors in certain localities. Even old-established firms are frequently compelled to resort to plumbing and gas work; in this way they are helping gas progress and operating detrimentally to their own and to general electrical interests.

Adequate Funds Needed

Supply authorities which wish to develop their areas properly must offer every possible amenity to promote the use of electricity, but one wonders whether the casual attitude of many authorities, especially with reference to contracting work, may not result in disaster later on. Many of them maintain that the average contractor cannot fulfil the duty and responsibility of his position. In some localities that view appears justifiable, but it does not supply a valid reason for the general situation. The problem need not resolve itself into a specific case for or against municipal trading; it is one calling for reasonable collaboration to the advantage of contractors and suppliers alike and the general development of electricity.

Many contractors have only a very limited capital and they cannot afford extensive showrooms or carry large stocks of appliances—especially costly ones such as cookers and washing machines. Supply authorities must therefore provide adequate showrooms and arrange exhibitions, demonstrations, and the sale of large and costly apparatus. Considerable capital is necessary for hire- and easy-purchase schemes, and they must be run in conjunction with quick repairs and efficient service. Simple hire is for load building and not for making a direct profit; it is really the work of the supply authority. Instalments for easy purchase can be collected through prepayment meters.

When the sale of small articles such as lamps and the competitive undertaking of house wiring are considered, the question assumes a different complexion, and the contractor's grumble carries a considerable amount of conviction. Supply authorities often charge contractors with shoddy and indifferent wiring, but remain oblivious to the fact that the remedy lies within their reach in the shape of wiring rules and regulations. For assisted wiring and housing schemes, stipulations as to material, type, and design of installations, &c., can easily be incorporated in contracts. Credit should be given to contractors who are associated with the National Register and the E.C.A.

Repairs and "Service"

The question of ordinary installation repairs is closely linked with that of repairs to apparatus on hire and the replacement of fuses controlling such apparatus. Contractors are often called in to attend to faults, only to find sectional main fuses for hired appliances blown. Because of the increased use of portable apparatus such troubles are likely to become an increasing nuisance to consumers and supply authorities, especially as contractors usually have no indication of, or method of determining, which are the sectional main fuses, and the question is prompted: Would it be practicable or advisable to allow contractors to undertake repairs to hired apparatus and to replace such fuses? Such an arrangement, although admittedly precarious from many points of view, might prove much less costly, quicker, and generally more advantageous than a service from one central place.

The present lack of co-ordination between supply authorities and contractors is difficult to understand. Very many contractors are entirely unconversant with the domestic tariffs and hire and service facilities offered by their local supply authorities, yet consumers must obviously regard them as reliable sources of information.

There is good reason why supply authorities should lend appliances to contractors for advertising purposes, and divide the revenue obtaining from resulting sales. While many contractors' showrooms are small and insignificant, some of the large centralised showrooms are so immaculate and elaborate that often the self-conscious and the poorer would-be buyer proceeds no farther than the threshold. This psychological point should be considered in connection with any selling scheme. Because householders are generally well acquainted with the shops and tradesmen in their own locality a number of small showrooms might well attract more consumers.

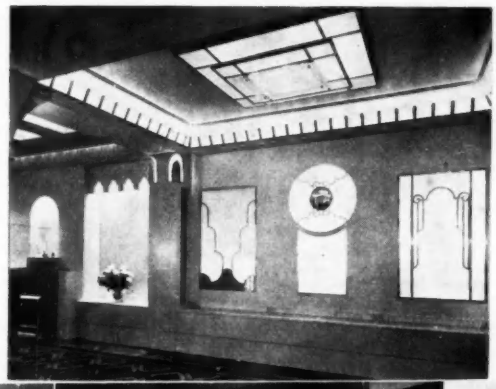
The scope for domestic development is so extensive that the door should be left open to all responsible newcomers, but if the present lack of co-operation and the discouraging attitude of many supply authorities to contractors continue there will be a gradual elimination of small contractors, with consequent loss of business to the undertakings. The maintenance of equitable trading for all the interests concerned is essential to success in any commercial enterprise, and because the electricity supply industry cannot be an exception the present difficulties should not be allowed to assume serious dimensions.

British Overseas Electrical Trade in September

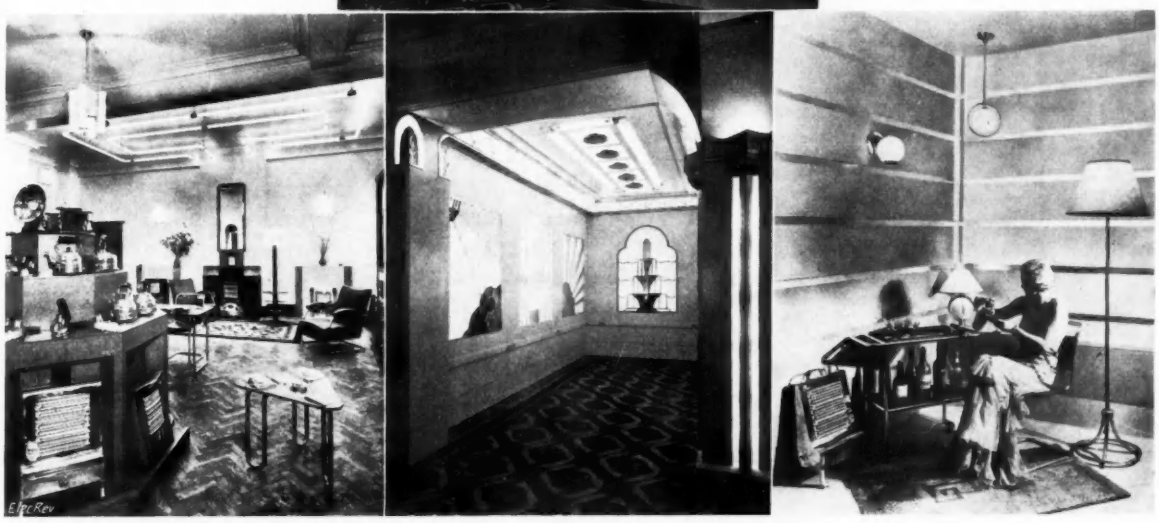
	Exports.			Imports.			Re-Exports.		
	Electrical exports for Sept., 1933.	Inc. or dec. as compared with Aug., 1933.	Inc. or dec. as compared with Sept., 1932.	Electrical imports for Sept., 1933.	Inc. or dec. as compared with Aug., 1933.	Inc. or dec. as compared with Sept., 1932.	Electrical re-exports for Sept., 1933.	Inc. or dec. as compared with Aug., 1933.	Inc. or dec. as compared with Sept., 1932.
Insulated wires and cables ...	£107,491	− £1,276	+ £32,128	£21,536	− £2,127	− £1,303	£162	− £14	+ £104
Electric carbons	4,496	+ 2,537	+ 2,182	11,304	− 4,336	− 963	10	− 15	− 28
Arc lamps and searchlights ...	2,243	+ 2,071	+ 988	72	− 159	− 8	2	− 28	− 34
Incandescent lamps	34,603	+ 1,701	+ 5,406	14,217	− 2,732	− 641	899	+ 249	+ 250
Other lighting apparatus ...	25,563	+ 1,072	+ 1,056	31,063	+ 3,306	+ 4,973	2,317	+ 150	+ 1,094
Batteries and accumulators ...	78,673	+ 28,851	+ 26,096	679	− 616	− 7,538	58	− 3,531	+ 2
Meters and instruments ...	19,128	− 3,571	+ 533	25,816	+ 1,474	+ 6,153	93	− 181	− 10
Unenumerated electrical goods and apparatus	76,377	− 1,563	− 9,557	39,204	+ 430	− 16,231	2,741	+ 36	+ 1,100
Telegraph and Telephone Cable and Material—									
Telegraph and telephone wires and cables (not submarine)	17,285	− 26,990	− 2,596	132	− 52	− 199	12	+ 12	− 6
Submarine telegraph and telephone cables...	1,360	− 13,203	− 2,990	47	+ 47	+ 47	—	—	—
Telegraph and telephone apparatus	172,170	+ 6,084	+ 53,271	123,101	+ 36,698	− 2,858	2,610	+ 1,228	+ 1,248
Electrical Machinery—									
Railway and tramway motors	4,456	+ 4,406	+ 4,075	—	—	—	—	—	—
Other motors and generators...	119,500	+ 44,964	+ 23,682	—	—	—	—	—	—
Unenumerated electrical machinery	111,070	+ 29,368	− 31,754	18,265	− 1,791	− 8,439	3,668	+ 2,099	− 1,890
Total	£774,415	+ £74,451	+ £102,520	£285,436	+ £30,142	− £27,007	£12,572	+ £5	+ £1,830
Decrease for the first nine months of the year... ...	Exports. £244,113			Imports. £373,943.			Re-Exports. £45,999.		

The G.E.C. Illumination Showrooms

AT the invitation of the General Electric Co., Ltd., a Press visit was paid to the company's reorganised showrooms at Magnet House, Kingsway, on October 13th, to view the latest developments in illumination. The company has studied electrical lighting in relation to furnishing and decorative schemes, natural bronze, old silver and chromium plate predominating in the present range of lighting fittings. These have been designed to fit in with practically any scheme, either of period or modern design. The company believes that future developments lay in the direction of "architectural" illumination, which previously could only be made clear to prospective users by means of drawings and verbal explanations, and has decided that it should be just as demonstrable as other forms of lighting. The showrooms therefore include various demonstrations of this system for the inspection of architects, consultants, decorative artists, electrical contractors, and prospective users interested in modern illumination. Several applications are demonstrated of various types of architectural illumination, together with a wide range of lighting fittings of suitable design to harmonise with this method of built-in illumination.



There are numerous rooms, tastefully laid out and illuminated and equipped with electrical apparatus appropriate to their furnishing and decorative schemes. Utility and decorative lighting, in which the fullest use of the emitted light is made, are combined in a large apartment divided into four rooms, where some twenty-five separate architectural illumination features, all revealing differing phases of lighting treatment, are demonstrated. These structural lighting settings consist of fountains, recessed windows with rainbow-hued curtains of light, the rays of sunrise or sunset, and mirror lighting settings. One room is set apart for demonstrating electric cookers and here the company has models specially designed to meet the needs of the Dominions and Colonies. An impression of the showrooms can be obtained from the accompanying illustrations.



The reorganised showrooms of the G.E.C. in which special attention has been given to architectural illumination

In the Courts

THE action for damages brought by Mrs. Bertha Sparke against Messrs. L. G. Hawkins & Co., Ltd., was concluded before Mr. Justice Hawke in the King's Bench Division last week. As we reported in our last issue, the plaintiff alleged breach of warranty of an electric ironer and, alternatively, breach of duty on the part of the defendants in not warning the plaintiff of the dangerous character of the appliance. She stated that, owing to an alleged defect, she had sustained burns to her right hand.

Sir Duncan Watson, M.I.E.E., continuing his evidence, described experiments that he had made with various plugs, and found no signs of burning at the point of contact. He had examined the adaptor used by Mrs. Sparke and found that only one screw which secured the cover to the base of the adaptor was in place; the other was missing.

Mr. Henn Collins said that the plaintiff's case was not that the plug was of unsuitable type, but that it was defective in the way it was constructed. Sir Duncan Watson, in further evidence, said it was almost impossible for a fuse to take place if the cap which was held by two screws on the plug had not been displaced.

Mr. L. R. Morrell, manager to Mr. Thos. H. Smerdon, an electrician in Kentish Town, who was responsible for the installation of Mrs. Sparke's electrical appliances and through whom the electric ironer was ordered from the defendants; Mr. L. G. Gregory, an electrical mechanic formerly in the employment of the defendants; and Mr. A. T. Morris, B.Sc. (Eng.), Superintendent of the Faraday House Testing Laboratory, also gave technical evidence on behalf of the defendants.

Mr. T. F. J. May, showroom manager to the defendant company, was questioned as to a defence pleaded by the defendants that they did not sell the ironer direct to the plaintiff. The witness said that the order was invoiced to Mr. Thomas H. Smerdon, the local electrician, who was going to install the ironer.

At the conclusion of the evidence called by the defendants Mr. Henn Collins, K.C., addressed the jury on behalf of plaintiff and Mr. Montague Berryman on behalf of defendants.

His Lordship summed up and put a number of questions to the special jury. These questions and the answers given by the jury were as follows:—(1) Did the defendants sell the ironer to the plaintiff? Yes. (2) Was it in the course of the defendants' business to sell and supply ironers of this description? Yes. (3) Did the plaintiff make known to the defendants the purpose for which she required it, so as to show that she relied on their skill and judgment to supply an article reasonably fit for the purpose for which it was required, or, alternatively, was this purpose sufficiently indicated by the description of it? Yes. (4) Was the ironer reasonably fit for the purpose for which it was intended when it was delivered? Yes. (5) Did the defendants warrant that the plug on the ironer was reasonably fit for use on a 30-A circuit? General warranty as in question 3. (6) Was the plug, in the absence of any defect, fit to be used on a 30-A circuit? Yes. (7) Was the lamp socket fit for use to at least 30 A? Yes. (8) If so was the plaintiff in plugging into the socket acting negligently? No. (9) Was the plaintiff negligent in attempting to insert the plug into the lamp socket when the current was turned on? No. (10) Was the plaintiff negligent in using it as she did and, if so, did her negligence cause or contribute to the accident? No. (11) Was the plaintiff injured by reason of a defect in the plug? Yes. (12) If the plug was defective was the injury to the plaintiff caused solely by reason of the defect or by reason also of the plug being inserted into a circuit fused to 30 A? It was aggravated by the fact of the fuse being for 30 A. (13) Was the ironer a dangerous thing as supplied by the defendants? No. (14) If so, was it a danger of which the defendants knew or ought to have known? The question does not arise.

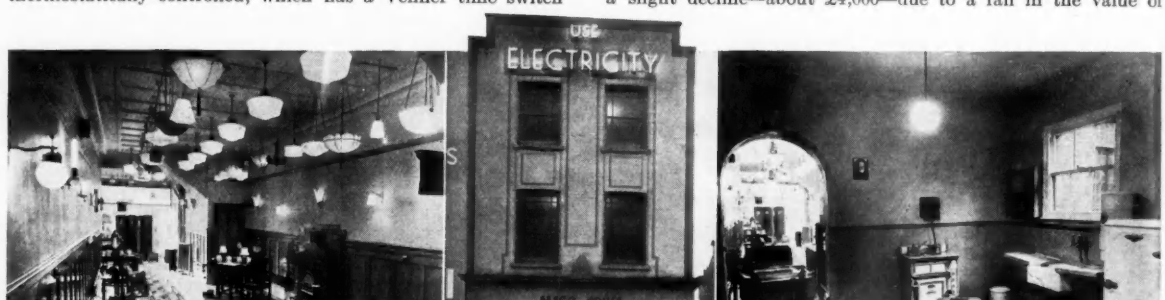
His Lordship said that on these findings he must enter judgment for the defendants with costs.

Business and Industrial Notes

The Week's Electrical Trade News from all Sources. Commercial and Industrial Developments, Business Changes, Market Prices for Materials, Trade Openings, New Publicity Literature, Liquidations, and Failures

The Boston Supply Company's New Showrooms

The Boston and District Electric Supply Co., Ltd., has recently opened new showrooms on a site in Boston Market Place. A large neon sign worded "Use Electricity" occupies a prominent position on the top of the building. The main ground-floor showroom is panelled in light oak, and at the far end is an inquiry office. The showroom leads to a model electric kitchen, beyond which are lamp and cooker stores, a sub-station to deal with the lighting and heating of the building, and the goods receiving department. On the first floor there is a suite of offices to let in the front portion, the middle portion containing a large demonstration room which serves normally as a showroom for inexpensive appliances and fittings. On the second floor there is a further suite of offices, including those of Mr. H. Payn, the engineer and manager. The building is heated by the "Heatrae" tubular system, thermostatically controlled, which has a Venner time switch to cut off during peak-load period. The building was reconstructed to the design of Mr. H. A. Mobbs, in collaboration with Messrs. F. E. Stanley (managing director) and H. Payn. The main contractors were Messrs. Fred Peck & Son. The lighting and heating installation was carried out by the company's own staff to the design of the manager, with the exception of the tubular heating, which was designed by Electric Fires, Ltd.



The new showrooms which have recently been opened by the Boston & District Electric Supply Co., Ltd.

The Boston Company has now an area of 270 sq. miles. Practically every parish containing a village is now receiving a supply, but many Fen district parishes comprise hundreds of houses scattered over a large area with no self-contained village. In such cases groups, which can be economically reached, are supplied from pole transformers. Of the consumers, over 50 per cent. are in rural districts and nearly 1,000 agricultural labourers' cottages are connected to the system. In Boston practically every factory and works has changed over to the company's mains. There are now over 3,000 consumers. The company has hiring and assisted-wiring schemes in operation, and has recently introduced a prepayment meter assisted-wiring scheme. A genuine free-wiring scheme was responsible for the large number of rural consumers, who are such small wage earners that even assisted wiring was beyond their means.

An Efesca Cooker Display

Further expansion in the electrical showrooms of Messrs. Falk, Stadelmann & Co., has been effected during the past month, and a new room for the display of "Efesca" domestic cookers and industrial cooking apparatus has been added. The decoration of the room is such that it represents in a general manner the decorative scheme in the majority of modern houses, and a potential purchaser is thus able to visualise how a particular cooker will appear when installed in his home. A number of other rooms have been redecorated and brought up to date, following the trend of modern fashion and design. A view of the cooker display is on p. 567.

Trade Announcements

The telephone number of Siemens Electric Lamps and Supplies, Ltd., at 38-39, Upper Thames Street, E.C., has been changed to Central 2332 (10 lines).

The London depôt for Crompton and Kye lamps is now at 1-3, Brixton Road, S.W.9.

Messrs. Gent and Co., Ltd., have transferred their branch office at Newcastle-upon-Tyne to "Tangent House," Leazes Park Road.

The Fuller Accumulator Co. (1926), Ltd., has removed its Birmingham branch to more commodious premises at 48, Gt. Charles Street, Birmingham. The depôts at 6, York Place, Leeds, and 31, Spring Bank, Hull, have been closed and supplies of Fuller accumulators are available at the Manchester depôt, 19, Chapel Walks, Cross Street, Manchester.

The business of Mr. F. R. Hodges, manufacturers' agent, 180, High Street, Hull, has been reorganised under the title of Hodges & Taylor, at the same address.

The Modinstal Electric Co. has removed its offices and works to 2 and 3, Oldham Terrace, High Street, Acton, W.

Electrical Machinery Exports in September

Although there was a substantial increase in the total value of electrical exports during September as compared with the corresponding month of 1932, the machinery section showed a slight decline—about £4,000—due to a fall in the value of exports of the "unenumerated" class. The distribution of September exports of electrical machinery is shown below. Our usual table containing particulars of the month's overseas electrical trade appears on page 562.

	Quantities. Tons, Sept., 1933.	Inc. or dec.	Value. £ Sept., 1933.	Inc. or dec. £
European countries	428	– 348	77,647	– 36,963
Japan	—	– 4	123	– 972
South America	67	– 5	12,650	– 3
South Africa	481	+ 375	55,344	+ 39,725
British India	261	– 74	37,247	– 8,854
Australia	63	+ 31	10,504	+ 5,030
New Zealand	28	+ 9	4,196	– 434
Canada	23	– 60	3,105	– 6,965
Other countries	205	+ 34	34,210	+ 5,439
Total	1,556	– 42	£235,026	– £3,997

The figures show that Japan has practically ceased to be a buyer of British electrical machinery. A large decrease in exports to the Continent was more than counterbalanced by the substantial rise in South African purchases. Australia again showed an improvement, as did "other countries," but all the other markets showed a decline.

Prices of Materials

Messrs. F. Smith & Co. report, October 18th: Copper (electrolytic) bars, and sheets, no change. Ditto, ditto, wire rods. £45 10s., 10s. dec. Ditto, ditto, h.c. wire, $7\frac{3}{16}$d., $\frac{1}{16}$d. dec. Silicium bronze wire, $8\frac{5}{16}$d., $\frac{1}{16}$d. dec.

Messrs. James & Shakespeare report, October 18th: No change in price of copper bars, sheet and rod, and English pig lead.

Messrs. Edward Till & Co. report, October 18th: No change in the price of india-rubber, Para fine.

"Exide" Progress

Mr. D. P. Dunne, managing director of the Chloride Electrical Storage Co., Ltd., presided at the company's annual luncheon in connection with the Motor Show on October 12th. He said that in spite of the batteries which were advertised at low prices throughout the country, "Exide" batteries were still making headway, and the company's works were fully employed. In the course of his speech he made reference to the many advantages of the electric vehicle which, he contended, was grossly overtaxed. Other directions in which the company was finding employment for its batteries were the "Keepalite" emergency lighting system, Diesel buses and coaches, and the Diesel battery-electric "three power" loco-

motive. The export side of the business showed continued expansion.

Rubber-free Moulded Insulation

In our issue of September 15th (page 354) we printed a note on the use of a new insulating moulded compound, named "Mycalex," in Germany. Messrs. Mycalex (Parent) Co., Ltd., inform us that this material is a British invention; it is manufactured in Germany, and also in the United States, under a licence from them. There are certain differences in the compound as made in the different countries. Thus British "Mycalex" has a specific gravity of 2.6 with a breakdown strength of 30 kV per mm., as against the German figures of 3.3 and 15 kV respectively. Reference was made to the machining of the German material with Widia-tipped tools, but it is claimed that the British product can be machined quite well with the aid of tools made of any ordinary high-speed steel.

A Blackburn Electricity Department Exhibit

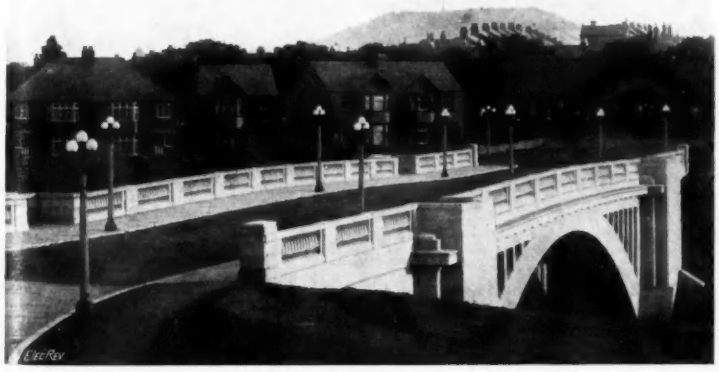
An interesting stand has been arranged at the Industrial Exhibition held in the Blackburn Public Hall by the Blackburn Corporation Electricity Department under the supervision of Mr. W. Royle, the electrical engineer. The foyer was taken up with the latest electrical domestic equipment, and Mr. Royle states that there was a large number of inquiries as a result, and he is anticipating that this will reflect itself in increased sales. Our picture shows a front view of the stand.

An exhibit by the Blackburn Electricity Department

Electrical Exhibition at Walthamstow

An electrical exhibition organised by the Borough Electricity Department is being held at the Drill Hall, Church Hill, Walthamstow, from October 16th to 21st. The Corporation's stand is divided into three sections having a representative display of lighting fittings and domestic apparatus. The centre of the stand is furnished as a rendezvous for the reception of prospective consumers, while a section has been set apart as a demonstration kitchen with seating accommodation for about fifty people. The exterior of the hall is floodlighted by G.E.C. units. In sending us particulars of the exhibition, Mr. G. R. Spurr, the borough electrical engineer and tramways manager, states that an extensive advertising campaign has included the delivery of over 30,000 invitations to householders and shopkeepers by unemployed lads under supervision, and the use of the E.D.A. processional car for parading the streets on two days during the exhibition. E.D.A. literature has also been extensively used. As the town is cabled throughout, Mr. Spurr states that there will be no need to decline any application for a supply. The Council is anxious to develop the domestic load, and it is hoped that the exhibition will add an appreciable number of consumers under the assisted wiring scheme; over 12,000 have been secured since it was first introduced in 1923. The following firms are exhibiting:—

Aidas Electric, Ltd.; Associated Fire Alarms, Ltd.; Butler's Radio, Ltd.; Cox-Cavendish Electrical Co. (1924), Ltd.; Duroglass, Ltd.; Edison Swan Electric Co., Ltd.; East London Mica Works; Falk, Stadelmann & Co., Ltd.; Frigidaire, Ltd.; General Electric Co., Ltd.; Harmer & Simmons; W. T. Henley's Telegraph Works Co., Ltd.; Hobart Manufacturing Co.; M.K. Electric, Ltd.; Revo Electric Co., Ltd.; Santon, Ltd.; Simplex Electric Co., Ltd.; Sloan Electrical Co., Ltd.; Wholesale Fittings Co., Ltd.; Wilkins & Mitchell; Witherington Bros.



Modern lighting equipment on Peasholme Bridge

North London Exhibition

The North Metropolitan Electric Power Supply Co. has an excellent display at the eighth annual North London Exhibition, which was opened at the Alexandra Palace on Wednesday last week by Lord Rochdale and will remain open until October 28th. We saw representatives of both the supply company and various manufacturers busy on the "Northmet" stand. Actually there are two stands facing each other across a gangway, but a roof common to both and the gangway gives a composite effect, and the generous supply of l.t. filament illuminating tubes (Maple & Co., Ltd.), on the ceiling supports the company's claim that the stand is the best lighted one in the exhibition. About half the larger section is devoted to cooking-equipment exhibits and demonstrations, and there we saw Belling, B.T.-H., G.E.C., and Jackson cookers. In an appropriate section are Ferranti water heaters, and a "Heatrae" under-the-basin unit, while a cut-way water tank reveals an immersion heater and thermostat for conversion work. A "Magnet" washing machine and a "Servis" similar equipment complete with an ironer, together with Hawkins and "Burco" wash-boilers, make a good show in the laundry section. Kelvinator, Prestcold, and Electrolux refrigerators may be seen. Among an extensive display of smaller appliances is a very large model of an iron surrounded by actual irons of G.E.C., Hotpoint, Revo, and Siemens manufacture. Other manufacturers represented include Smith's Electric Clocks, Ltd., Bulpitt & Sons, Ltd. (kettles), the Electric Domestic Appliance Co. (kettles), Berry's Electric, Ltd. (fires), Edison Swan Electric Co., Ltd. (shaving mirror), W. T. Henley's Telegraph Works Co., Ltd. (soldering iron), and John Shaw and Sons (Wolverhampton), Ltd. (toasters). A picture of the display appears on page 556.

Modern Bridge Lighting

A good example of modern bridge lighting is shown in the accompanying illustration of Peasholm Bridge at Scarborough. This bridge in question was constructed some months ago and Revo lighting equipment was selected to illuminate it. The Revo Electric Co.'s "Zealand" standards with "Wellington" ornamental brackets and 10-in. diameter globes have been used, and, as will be seen, an excellent result is obtained.

Action Against Japanese Lamps

The *Electrical World* reports that anti-dumping orders against incandescent electric lights from Japan have been ordered by Acting Secretary of the Treasury Acheson upon the grounds that they were likely to injure the domestic industry and "likely to be sold in the United States at less than their fair value." Imports of electric lamps for the seven months ended with July, 1933, amounted to 58,494,480 lamps and were valued at $388,470. In July, the last figures available, the monthly imports amounted to 7,505,379, valued at $43,508. This compares with 9,219,126 lamps, worth $103,118, imported in July, 1932, and 6,700,995 lamps, worth $156,615, in July, 1931. The total for the first seven months of 1932 is 56,125,924 lamps, valued at $704,175. The dumping duties range from 3 or 4 cents to 50 cents per hundred on lamps, depending on the particular shipment. The duty prescribed in the Tariff Act of 1930 on incandescent electric lamps is 30 per cent. *ad valorem*.

Advertisement Correction

The Simplex Electric Co., Ltd., asks us to state that it incorrectly gave the price of the "Iris" fire as 8s. in its advertisement on supplement page 79 of our last issue. The fire illustrated costs 15s. 9d.; it is the 1-kW model which is priced at 8s.

Our Domestic Special

The illustration of the Siemens electric cooker on page 495 of our last issue is the "Xcel breakfast cooker" and not the "Xcel Minor," and the illustration of the company's immer-

sion-heater combination on page 499 is shown upside down.

The price of the Siemens " Neonic " lamp for house name signs (page 484) is 10s., not 5s.

Premier Electric Heaters, Ltd., point out that some of the details of their products were taken from their List No. 225 which has lately been superseded by Lists Nos. 238 and 240. The " No. 434 " table kettle is no longer being produced, the illustration so described (page 494) showed the " Quickset " kettle. The lowest price of the latter is £1 10s. (copper) and that of the " Laundwell " iron 12s. 6d. (4½ lb.). The additional cost of signal connectors is 2s. 6d. for " Smoothwell " irons and 2s. 9d. for " Laundwell " irons.

Registered Electrical Contractors

Applications for registration from the following were accepted by the Executive Committee of the National Register of Electrical Installation Contractors at its last meeting :—

Vernon, H., Northenden, Manchester.
White, A. F., & Sons, Salford.
Drummond, P., & Son (Electric), Ltd., Dumfries.
Leather & Strong, Chelsea, S.W.3.
Pope, V. J., & Co., Plymouth.
Stephens, P. Campbell & Co., Manchester.
Ferguson, H., & Co., Homerton, E.9.
Sefton Electric Co., Wavertree, Liverpool.
Taylor, T. E., Leicester.
Walters, C. T., Banbury.
Blackburn & Murgatroyd, Stretford, Manchester.
Booth, J. A., & Co., Altrincham.
Lamb, F., Nottingham.
Slater Bros., Cheetham Hill, Manchester.
Griffin, E. J., St. John's Wood, N.W.8.
Civil, T. A., Hexham.
Atkinson, E., & Co., Manchester.
Anderson, E., Rusholme, Manchester.
Sword, F., Whalley Range, Manchester.
Watson & Dalking, Darlington.

At the same meeting four applications were declined.

Recent Contracts

The old chimney stack in Carnaby Street, London, W.1, belonging to the St. James' and Pall Mall Electric Light Co., Ltd., is to be demolished. The company's premises are to be heated electrically; the contract for this work has been placed with Messrs. Richard Crittall & Co., Ltd., and the electrode boilers will be supplied by Messrs. Bastian & Allen, Ltd. The architect is Capt. C. S. Peach, F.R.I.B.A.

Over twelve miles of " Silvertown " Lengthmark cable (supplied by the India Rubber, Gutta Percha, and Telegraph Works Co., Ltd.), were used to wire the 145 houses comprising the new housing scheme for Burton-on-Trent, the electrical engineers for the contract being Messrs. Barnet & Soanes, Ltd., Burton.

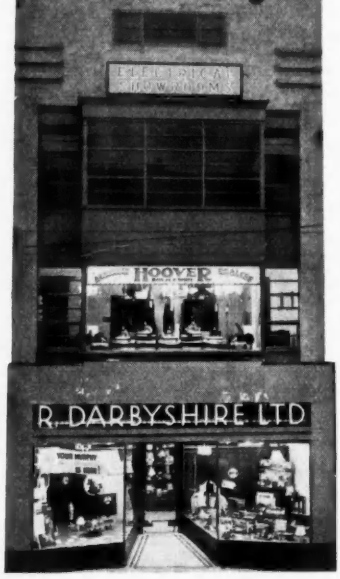
Sir W. G. Armstrong Whitworth & Co., Ltd., have received an order for a 12-ton, 95-b.h.p. Diesel-electric locomotive for Messrs. Henseckell du Buisson & Co. The locomotive will be used at the sugar cane plantations and works of St. Kitts (Basse Terre) sugar factory, West Indies.

New Municipal Showrooms

The Wimbledon Corporation has acquired premises in Malden Road, New Malden, for electricity showroom purposes, at a total cost (including fittings) of £4,000.

A Blackpool Electrical Firm's Showrooms

The new premises of Messrs. R. Darbyshire, Ltd., electrical and radio engineers, of Blackpool, which have been under construction for some time past, have now been opened. The new building is 50 ft. high and has two display windows. A wide range of lighting fittings and domestic appliances are displayed, many of them connected up for demonstration purposes. There are also large works where electrical equipment can be repaired. Here Messrs. Darbyshire will manufacture switchboards and rewind motors. An impression of the modern construction of the building can be obtained from the accompanying illustration.



The new premises of Messrs. R. Darbyshire, Ltd.

For Sale

Manchester Corporation Electricity Department has for sale boiler, &c., plant and surplus converting plant and transformers.

Messrs. Leopold Farmer & Sons invite offers for the purchase of plant and machinery, &c., of the British Ipso Battery Co., Ltd.

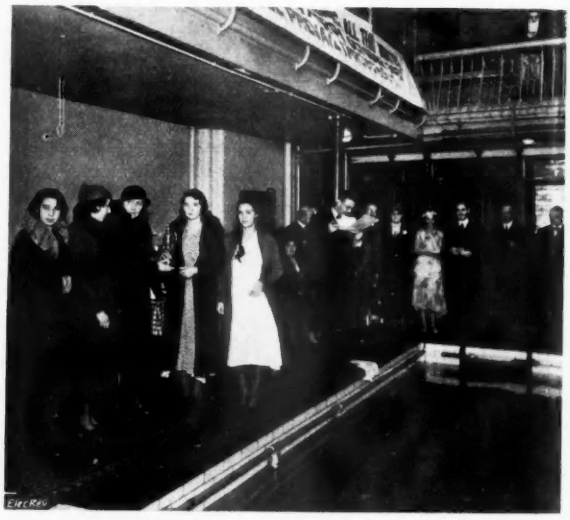
(See our classified advertisements.)

Signalling in Mines

In view of the tightening-up of the requirements of the Mines Department this year, Messrs. Gent & Co., Ltd., have had their more important " Tangent " apparatus recertified. This includes a magneto-type of mining telephone, 4-, 6-, and 8-in. bells, relay bells of a similar range, and a d.c. relay. The type number, certificate number, and date are cast on the cases.

Social Events

The " Henletel " Swimming Club concluded another successful season on October 13th, when it held its fourth annual gala at Holborn Baths. Among those present were Sir Montague and Lady Hughman, who presented the prizes at the conclusion, Mr. W. F. Bishop and Miss Joan Bishop, Sir Maurice Simpson and Lady Simpson, Mr. and Mrs. J. Lamont,



Lady Hughman presenting the prizes at the " Henletel " swimming gala

Mr. and Mrs. A. H. N. Jacob, Dr. P. Dunsheath, and Messrs. E. Lefeaux, J. Traxler, and W. G. Smale. A feature of the evening's sport was the competition for the London Business Houses A.S.A. men's diving championship, in which fourteen competitors took part. The gold medal for first place was won by Mr. A. Wild (Gilbeys-Castle), and the silver and bronze medals for second and third places respectively were won by Messrs. C. T. Tomalin (Bentinck), and F. Rodker (Lensbury and Brit. H.). The programme was concluded with a " Henletel " water burlesque—" A Roman Holiday." During an interval a collection taken on behalf of the E.I.B.A. realised £3 4s. 7d.

An Ediswan Window Display

In our last issue we referred to the window display campaign of the Edison Swan Electric Co., Ltd., for showing its torches, flashlamp batteries, &c., throughout the country. We have now received from the company a photograph of an excellent display of " Ediswan " torches, refill batteries, and Ediswan-Bulle clocks arranged by Messrs. W. Hughes & Son, 1, Hartfield Road, Wimbledon, S.W.

New Catalogues and Lists

Brown Bros., Ltd., Brown's Buildings, Great Eastern Street, E.C.—Catalogue No. 366 of domestic appliances, and 363 of wiring supplies.

Falk, Stadelmann & Co., Ltd., 83-93, Farringdon Road, E.C.—Catalogue No. 686 for the 1933-34 season of outdoor lanterns, shop interior units, floodlights, and industrial reflectors. Also a seasonal catalogue (P.1637) of " Rhodoid," " Rhodialine " and parchment shades and bowls. Also priced leaflets of refill batteries, flashlight bulbs, electric lamps, &c.

Charles Selz, 47/49, New Cavendish Street, W.—A card illustrating lamp shades.

British Insulated Cables, Ltd., Prescot, Lancs.—Publication P.F.113, relating to B.I. corrosion proofing protection for lead covered cables.

Ateliers de Constructions Electriques de Charleroi, 56, Victoria Street, S.W.—The October stock list of electric motors, &c.

James Beresford & Son, Ltd., Cato Street Works, Birmingham.—Lists P.11/15, 17 and 18, describing the range of Beresford " Stork " pumps.

Drake & Gorham Wholesale, Ltd., 77, Long Acre, W.C.2.—Catalogue of the new " Nolos " cylinder lagging jacket.

Hugh J. Scott & Co. (Belfast), Ltd., Volt Works, Ravenhill Avenue, Belfast.—A price list of Scott a.c. and d.c. motors.

Brook Motors, Ltd., Empress Works, Huddersfield.—A pocket price list (No. 360) of Brook motors.

Lighting Trades, Ltd., and Welsbach Light Co., Ltd., 51-55, Garratt Lane, Wandsworth, S.W.—Catalogue No. 356, containing illustrations and prices of lamp shades in glass, marbleoid, parchment and other materials.

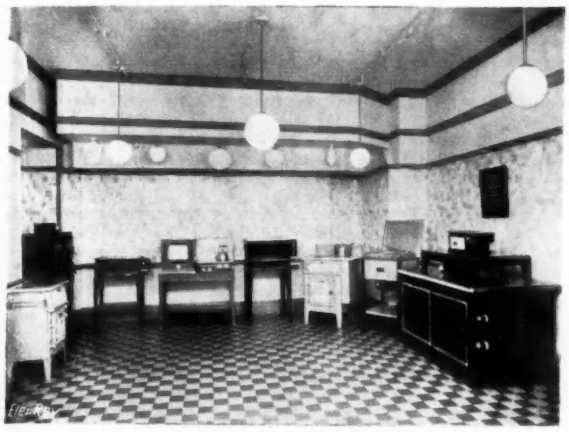
Ferranti, Ltd., Hollinwood, Lancs.—A folder giving illus

trated particulars of the more popular models of synchronous electric clocks manufactured by the company.

Edison Swan Electric Co., Ltd., 155, Charing Cross Road, W.C.—Publication No. C.L.868, illustrating in colour "Dormilux" bedhead shades and pendant shades to match.

A. Reyrolle & Co., Ltd., Hebburn-on-Tyne.—Pamphlet No. 329 describing Holmes's "Castle" type "R" d.c. motors and generators.

Belling & Co., Bridge Works, Southbury Road, Enfield, Middx.—An advance copy of an advertisement appearing in the



An "Efesca" cooker display

national daily Press relating to Belling electric fires. Also a booklet containing a full description and detailed specification of the new Belling cooker.

Crossley Bros., Ltd., Openshaw, Manchester.—"Crossley Chronicles" (publication 1513), describing a scavenge pump Diesel new-type marine engine installed on the trawler "Purple Heather."

General Electric Co., Ltd., Magnet House, Kingsway, W.C.—Folder No. 05.6646 containing particulars and prices of "Osram" automobile bulbs. Also the September number of the "Osram-G.E.C. Bulletin."

Lightalloys, Ltd., Alpax Works, St. Leonard's Road, Willesden Junction, N.W.—A reprint from the *Journal* of the Institute of Metals on the new improved "Alpax" alloys; also a leaflet dealing with the same subject.

Stewarts & Lloyds, Ltd., Kings Buildings, Dean Stanley Street, Millbank, S.W.—A comprehensive catalogue (pp. 160), fully illustrated, of steam pipe installations. Reference to the contents is facilitated by an index at the end of the volume.

Bankruptcy Proceedings

K. Godwin, electrical dealer, 1, Cecil Court, Charing Cross W.C.—This debtor attended on October 12th, before Mr. Registrar Warmington, and applied to pass his public examination upon accounts showing liabilities £1,399 and assets nil. Replying to Mr. Cresswell, Assistant Official Receiver, the debtor stated that in May, 1929, with £350 (advanced by his wife) he entered into partnership with another person carrying on business as an ebonite turner at Clerkenwell, under the style of Arrigoni & Son. They continued this business and also started an electrical jobbing business under the style of "Arrigoni and Godwin." His drawings amounted in all to about £6 a week from both businesses, which were continued until December, 1932, when in consequence of disagreement the partnership was dissolved. He afterwards continued the electrical business alone at No. 1, Cecil Court, Charing Cross Road, until the date of these proceedings. In May, 1930, a company styled Strombo Electrical Co., Ltd. (nominal capital £500), was formed to place on the market a new strip-light holder. He invested £400 (borrowed from his wife) in it and afterwards acted as a director at £4 a week until December, 1931. The company was unsuccessful and ceased to trade in June, 1932. The debtor attributed his insolvency to the collapse of the Strombo Co., to the failure of an electrical invention in endeavours to perfect which he borrowed from a moneylender, and to his having lived in excess of his income. The examination was concluded.

E. V. Russell, trading as the Skegness Electric Service, 2, Tennyson Buildings, Drummond Road, Skegness.—The public examination of this debtor took place at the Municipal Buildings, Boston, on October 12th. The statement of affairs showed gross liabilities of £626, of which £518 was expected to rank for dividend. The assets were estimated to realise £296 but were subject to preferential claims of £113. Debtor said that in 1926 he commenced trading with a partner. They undertook a contract for electrical work amounting to £100 at Mablethorpe, and afterwards traded at Louth. The partnership terminated in May, 1930, when debtor received assets relating to the electrical side of the business. He commenced trading at Skegness with a capital of £400. At the end of the first twelve months' trading he realised he had incurred a heavy loss. In the following year, there was a further loss, and his capital had been practically absorbed. The examination was closed.

E. V. Day, 16, King Street South, Chesterfield, Derbyshire, radio dealer and radio engineer, late 43a, St. Mary's Gate, and 27a, Beetwell Street, Chesterfield.—The public examination took place at the County Police Court, Chesterfield, on October 13th. Debtor had lodged a statement of affairs which showed a deficiency of £238. He attributed his failure to lack of capital, keen competition and ill-health. The examination was closed.

C. J. Cooper, director, 14, Gloucester Road, South Kensington, and Chorley Wood.—The public examination of this debtor was held on October 12th at the London Bankruptcy Court before Mr. Registrar Warmington, the accounts showing total liabilities of £14,492 (ranking £9,621) and net assets of £1,276. Debtor stated that in 1895 he commenced business in partnership with another as "Fippard & Cooper," electricians, at Bournemouth. Three years later he bought out his partner and in 1899 took his brother into partnership and they traded successfully until 1922, when the business was converted into a limited company styled Cecil Cooper & Co., Ltd. In 1925 he severed his connection with this company and formed Cecil Cooper & Co. (London), Ltd., to acquire its London branch. He was allotted 9,000 £1 shares in, and acted as managing director of, the new company at a remuneration of £1,200 (later increased to £1,500) per annum. The business was successful until 1932. In June, 1932, he lent £1,600 to the company, which made heavy losses by bad debts, and in April last went into voluntary liquidation. In May or June last he entered into negotiations with another person for the formation of a limited company to carry on business as electricians. On the failure of the negotiations a partnership business was formed but it had been repudiated by the other person. The position was the subject of legal proceedings, and he was unable to define his interest in the business or his liability for its debts. He attributed his failure and insolvency to the non-success of Cecil Cooper & Co. (London), Ltd., to his liability under guarantees given on its behalf, and to his having lived beyond his means. The examination was concluded.

R. J. C. E. Lovelock (Dunblane Magneto Service), electrician, 230, Portswood Road, Portswood, Southampton.—Trustee, Mr. F. H. Langmaid, Midland Bank Chambers, High Street, Southampton, Official Receiver, released September 28th.

S. Simmons, electrical engineer, 189, Whalley New Road, Blackburn.—Last day for receiving proofs for dividend, October 27th. Trustee, Mr. J. W. Carter, District Bank Chambers, Blackburn, Official Receiver.

E. C. Lawrence and **G. E. Lawrence** (Lawrence Bros.), electrical engineers, 508, Bristol Road, Bournbrook, Birmingham.—Receiving order made October 5th on a creditor's petition.

First meeting, October 23rd, at 9-11, High Street, Coventry. Public examination, November 6th, at the County Hall, Coventry.

A. M. Gibson and **W. R. F. Gibson** (Gibsons Wireless), radio specialists, 94, Tavistock Road, Plymouth, and at Exmouth and Teignmouth.—Last day for receiving proofs for dividend October 25th. Trustee, Mr. W. J. Ching, 8, Sussex Terrace, Plymouth.

S. A. Sears, radio engineer, lately carrying on business at 98, High Street, Redbourn.—Last day for receiving proofs for dividend, October 25th. Trustee, Mr. J. S. B. Hole, 240, High Holborn, W.C.

J. O. Grant, electrical engineer, 63, Queen Victoria Street, E.C.—Receiving order made October 10th on a creditor's petition. First meeting, October 23rd, and public examination January 18th, both at Bankruptcy Buildings, Carey Street, W.C.

G. Blades, electrical engineer, 55, Hainton Avenue, and 52, Pasture Street, Great Grimsby.—Application for discharge to be heard on November 8th at Town Hall, Great Grimsby.

S. H. Holly, electrician, 4, South Street, Wareham.—Trustee, Mr. F. H. Langmaid, Midland Bank Chambers, High Street, Southampton, Official Receiver, released September 28th.

Private Arrangements

Electra Contracting Co., 50, New Zealand Road, Cardiff, electrical engineers.—At a recent meeting of creditors a statement of affairs was presented showing liabilities of £1,319 and net assets of £372, leaving a deficiency of £948. The partnership was commenced by the debtors and another in December, 1919, with a total capital of £200. In 1929 economies were effected in the business, and one of the partners retired. Since that date the business had been continued by the present owners. In 1931 an arrangement was entered into with the principal creditors for the payment of their accounts in full over a period of two years. That arrangement, however, had not been carried out. Recently one of the principal suppliers commenced proceedings, and it was then decided to call the creditors together. It was understood that if the creditors would accept a reasonable composition, the claims of the cash creditors amounting to £687 would be withdrawn. It was decided that a committee should be appointed, consisting of the representatives of the General Electric Co., Ltd.; Electrical Conduits, Ltd.; and the Edison Swan Electric Co., Ltd., to decide upon the amount of and the security for a composition to be accepted. The following are creditors.—Electrical Conduits, Ltd., £188; Edison Swan Electric Co., Ltd., £76; General Electric Co., Ltd., £236; R. Leyshon & Co., £23.

Company Liquidations

Ideas Development Syndicate, Ltd.—Under the compulsory liquidation of this company which dealt in wireless sets, accounts have been lodged showing liabilities of £2,097 against assets £13, and a deficiency of £2,086 as regards contributories, the issued capital amounting to only £2. Mr. E. T. A. Phillips, Senior Official Receiver, the liquidator, reports that the company was promoted in January, 1929, by H. Erdman and H. Hardy. During 1929 the promoters experimented with a headlight dipper, but later decided to make and sell wireless sets. The company proceeded to make all-mains sets under a licence from Marconi's and continued to do so until October, 1931. Most of these sets were supplied to the General Tobacco Co., Ltd., which required the sets in connection with a cigarette coupon gift scheme, but towards the end of 1931 this business ceased. In February last judgment for £53 and costs, on which the petition was founded, was obtained by Marconi's against the company, in respect of royalties due. The failure of the company is attributed to heavy overhead charges in connection with the experiments on the headlight dipper; to heavy service and repair costs on the all-mains sets; to the fact that there was little or no effective demand for those sets in 1931; leakages of stock; lack of selling organisation, and to general trade depression.

Dissolution of Partnership

Deaves & Gosling, electrical engineers, 64, Crouch Street, Colchester.—Messrs. J. C. Deaves and A. R. Gosling have dissolved partnership. Mr. Gosling will attend to debts and carry on the business.

Electricity Supply

Lighting, Domestic, Power

Australia.—EXTENSIONS AT BRISBANE.—The City Council is raising a loan of £55,000 for extensions to the electricity supply system.

Beckenham.—TARIFF CHARGES.—The Urban District Council has adopted a special heating tariff for business premises, including shops, offices, factories, hotels, churches, and other public buildings, with a flat rate of 1d. per kWh, plus a charge of £5 per annum for each kW demanded between 4.30 p.m. and 8.30 p.m. during the winter quarters only, and a rent of 5s. per winter quarter for time switch and demand indicator.

Bovingdon.—SUPPLY FROM CHESHAM.—An order has been granted to the Chesham Electric Light Co. giving it authority to supply electricity in the Bovingdon districts, which is outside the present area of supply.

Bradford.—LOAN.—The Electricity Committee is seeking sanction to a loan of £20,000 for mains extensions.

Cheltenham.—LIGHTING IMPROVEMENTS.—The electrical engineer has revised the scheme for the improvement of the public lighting so that the cost will not exceed £3,000, and has submitted a list of improvements which he proposes to put in hand this year at a total estimated cost of £493.

CANVASS.—The Housing Committee has authorised the electrical engineer to have the Whaddon Road Estate canvassed, and if a sufficient number of tenants require a supply of electricity, to obtain tenders for carrying out the work.

Chesterfield.—ELECTRICITY PROFITS.—The accounts of the Corporation electricity undertaking show that for the past year there has again been substantial development with profitable results. The net profit for the year was £5,689. The undertaking provided a contribution in aid of the rates of £3,000, and the reserve fund and accumulated net surplus on revenue account amounted to £44,713.

Dover.—MAINS EXTENSIONS.—The Town Council has decided to carry out mains extensions at an estimated cost of £8,000.

Douglas.—LOAN.—The Town Council has applied to Tynwald for a loan of £8,900 made up as follows:—Mains and services (£6,800), meters (£1,700), and cookers (£400).

Dumfries.—DOMESTIC DEVELOPMENT.—The Town Council at its last meeting approved a recommendation by the electrical engineer that the Housing Committee consider the adoption of an optional two-part tariff (according to a scale) for the supply of electricity to municipal houses, the charge to be collected weekly with rents. Sale, hire, and hire-purchase schemes for domestic appliances were adopted.

Eccles.—LOAN.—The Electricity Committee is applying for sanction to borrow £10,000 for mains extensions.

AN ALL-ELECTRIC HOUSE TO BE PROVIDED.—The Electricity Committee is considering the provision of an all-electric house for exhibition purposes.

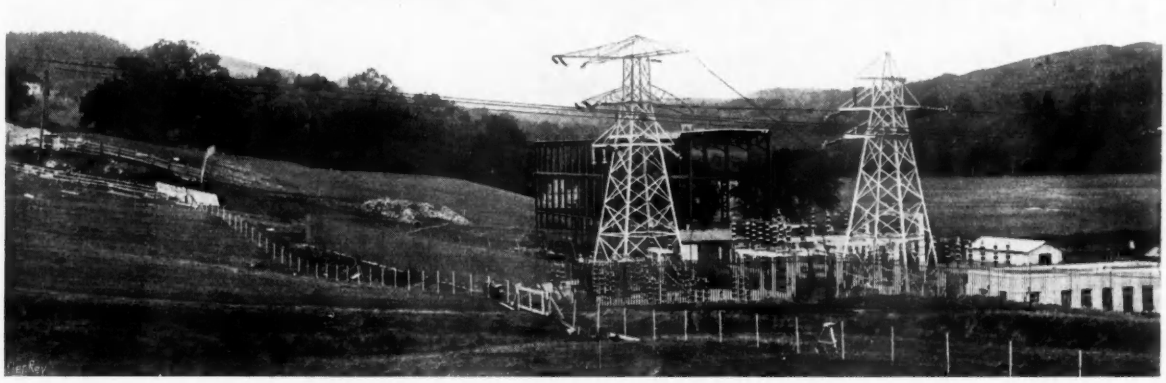
Eston.—CANVASS AT LOW LACKENBY.—It has been decided to make a further canvass at Low Lackenby for electric lighting.

France.—ELECTRICAL DEVELOPMENT.—According to the *Revue Générale d'Electricité*, the output of the sixty-six principal power stations in France, representing about 93.5 per cent. of the total French production, amounted during the seven months ended with July last to 5,690 million kWh as compared with 5,274 million kWh in the corresponding period a year ago, an increase of 7.9 per cent. Of the total, hydro-electric plants were responsible for 3,352 million kWh and steam and internal-combustion-engined stations for 2,338 million kWh.

Friern Barnet.—The Lighting Committee has recommended that the street lighting be changed over from gas to electricity, and that the North Metropolitan Electric Power Supply Co. provide for the lighting of the whole district at a cost of £1,772 per annum for 604 lamps.

Gainsborough.—LOAN SANCTIONED.—The Urban District Council has received sanction to a loan of £3,800 in connection with the assisted house-wiring scheme and the introduction of prepayment meters.

Galloway.—COMPLETION OF TUNNEL.—Another step towards the completion of the Galloway Hydro-Electric Power Co.'s undertaking was accomplished on October 10th, when Sir Andrew Duncan, chairman of the Central Electricity Board, fired the last shot which broke through the remaining six feet of solid rock in the Glenlee Tunnel. Two previous junctions had already been made in the three and a half miles of tunnel, which will carry water from the dam on the River Dee at Craigenhay in the Galloway hills to the power station at Glenlee, which will be equipped with two water turbines coupled to two 12,000-kW alternators. The contract for the construction of the tunnel was secured by Mr. A. M. Carmichael, Edinburgh. The tunnel has been driven through practically solid rock for its whole length and 150,000 tons of material have been cleared by the use of 200 tons of explosives. The mean diameter of the cutting is about 18 ft., which will be reduced to 11 ft. 6 in. by concrete lining. The tunnel emerges on a hillside some 250 ft. above the power station, and a steel pipeline will carry the water down the surface of a steep rocky slope to the water turbines. The cost of the tunnel alone is £300,000. Among those present at the ceremony, in addition to Sir Andrew Duncan, were Lord Meston, chairman of the company, Sir Archibald Page (Central Electricity Board), and Sir Alexander Gibb, the consulting engineer. The company's scheme includes the erection of five hydro-electric stations with a total capacity of 140,000 h.p. The first stage of the scheme comprises the Tongland and Glenlee stations, with a combined capacity of 80,000 h.p., and these are now in course of construction. When completed the system will feed into the national grid and supply also the local distribution networks of the Kirkcudbright and Dumfries County Councils.



This picture shows the Glenlee power station of the Galloway hydro-electric power station. On the left is the outlet of the three and a half mile tunnel between the station and the Clatteringshaws reservoir

Gateshead.—STREET LIGHTING.—Permission has been given by the Town Council to the North-Eastern Electric Supply Co., Ltd., to light the streets of the Ravensworth Estate by electricity.

Gillingham.—LOANS.—The Town Council has applied for sanction to loans of £20,000 for mains and services, £15,000 for consumers' apparatus, and £15,000 for the wiring scheme.

Great Yarmouth.—YARMOUTH-LOWESTOFT AGREEMENT.—In response to the Lowestoft Corporation's application for a general revision of prices regarding the bulk supply of electricity under the agreement entered into by the two Councils in 1927, the Great Yarmouth Corporation has agreed to reduce the charge per kVA from £3 10s. to £3 7s. 6d. as from September 1st. The question of a revision of the "unit" charge will, it is understood, be considered when Yarmouth Corporation has commenced to take a supply from the Central Electricity Board.

Hailsham.—ELECTRICITY EXTENSIONS.—The Weald Electricity Supply Co., Ltd., has informed the Rural District Council of its intention to extend forthwith the l.p. overhead distribution mains at Amberstone to Swingate Cross, Hellingly, and also to Hooe. The Eastbourne Corporation is to extend its mains in the Council's area at Hailsham and Polegate.

Halifax.—LOAN SANCTIONED.—The Town Council has received sanction to a loan of £37,813 in connection with extensions to the generating station.

Ilford.—YEAR'S PROFIT.—The Electricity Committee reports a net profit for the past year of £17,569. There are now 29,432 consumers, an increase of 2,670 for the year.

LOANS.—The Electricity Committee is seeking sanction to borrow £50,000 for mains and services; £10,000 for domestic apparatus for hire; and £10,000 for wiring.

Lanark.—ELECTRICITY FOR HOUSING SCHEMES.—With the primary intention of securing permission to introduce electric lighting into the housing schemes in St. Leonard Street,

Lanark, the tenants have formed a Ratepayers' Association, and will shortly place their proposal before the Town Council.

Littlehampton.—REDUCED TARIFF.—The Sussex Electricity Supply Co., Ltd., has decided to reduce its rates for the supply of electricity in Littlehampton, as from the December quarter readings, to below the "unit" rate now charged in Rustington and Worthing. For lighting purposes only the company offers charges varying from 4½d. to 3½d. per kWh, according to the quantity consumed, while the rate under the domestic and commercial two-part tariffs is 0.7d. per kWh, plus the fixed annual charges. A comparative statement issued by the company shows that its new lighting rates will be ½d. per kWh under Worthing, 1½d. under Rustington (which receives its supply from Worthing), 1½d. under Bognor, and 3½d. below Arundel.

As announced in our issue last week, a provisional arrangement has been come to between the Littlehampton Urban District Council and the Worthing Corporation whereby the Council will acquire the undertaking from the present owners under purchase rights contained in the Littlehampton Special Order and will transfer it to Worthing. This arrangement has already received the approval of the Worthing Corporation in General Purposes Committee, but still awaits endorsement by the Littlehampton Council. It is also subject to the necessary Order and sanctions being obtained from the Electricity Commissioners.

Liverpool.—CLARENCE DOCK STATION EFFICIENCY.—Alderman F. C. Wilson, chairman of the Electric Power and Lighting Committee, states there is every reason to anticipate an even higher efficiency at the Clarence Dock power station during the winter months. During the six months ended September 30th the thermal efficiency of the station rose to 25.64 per cent., as compared with 24.72 per cent. in the year 1932. He mentioned that the number of consumers was now 101,071. Of the 168 million kWh generated in the six months to September 30th, the domestic supply absorbed 73 million kWh.

Maidstone.—SUPPLY TO LEEDS CASTLE.—The Electricity Committee has entered into an agreement with Lady Baillie for a supply of electricity to Leeds Castle.

Malmesbury.—PROPOSED EXTENSIONS.—The Wessex Electricity Co. has informed the Rural District Council that it is proposed to extend the mains to the Filands end of Malmesbury early next year; the parish of Lea will also be included in the scheme.

Malvern.—LOAN SANCTIONED.—The Urban District Council has received sanction to a loan of £2,000 for sub-stations and equipment.

Milford Haven.—SPECIAL ORDER.—The Urban District Council has applied for a Special Order authorising it to supply electricity in the parishes of Hubberston and Steynton.

Motherwell.—NEW TARIFF.—From November 15th the Town Council is introducing a new "utility tariff" to encourage the use of electricity. The total charge for one room will be 24s. per annum, while for a six-roomed house it will be £4.

Oldham.—DOMESTIC PROGRESS.—Total sales of appliances by the Electricity Department to date include 1,086 fires, 3,489 vacuum cleaners, 239 washing machines, 112 water-heaters, and 528 irons. It was reported at the last meeting of the Committee that the total number of hired cookers on circuit was 2,127 and boilers 1,217.

Paisley.—EXPENDITURE APPROVED.—Mr. J. E. Adam, electrical engineer and manager, at the last meeting of the Town Council Electricity Advisory Committee submitted particulars of additional capital required by the Department, as follows: Meters, £6,000; domestic apparatus (for hire), £4,000; consumers' wiring installations (for hire), £2,000; ordinary mains extensions and services, £3,000; specified distribution extensions, £57,650. With regard to the last item, the engineer explained that the money was required to provide cables, transformers, switchgear, and metering equipment for the supply to Messrs. J. & P. Coats, Ltd. The amount includes £11,897 for Anchor Mills and £45,753 for Ferguslie Mills. The Central Electricity Board will refund the interest and sinking fund for the whole of this expenditure. The Town Council has approved the proposals.

Peterborough.—LOANS.—The Town Council has applied for sanction to a loan of £1,500 for extending the h.p. main on the Yaxley termination by means of an underground cable in order to give a supply to Stilton and Norman Cross Hotel. A loan of £1,000 has also been applied for for the purpose of stocking the new electricity showroom.

Rochdale.—DANE STREET POWER STATION.—The Electricity Committee has decided to resume the generation of electricity at the Dane Street station. It appears that the Lancashire Electric Power Co. is unable to continue the special terms which the Corporation has enjoyed for some time. These were so attractive that the Corporation took the whole of its requirements of electrical energy from that source. The Power Company has now intimated that, owing to the increased demands on its own plant, it is unable to continue to give the Corporation the benefit of special terms.

Scarborough.—CHRISTMAS ILLUMINATIONS.—A scheme of floodlighting for Christmas has been approved by the Town Council, and it is hoped to make the town one of the most brilliantly illuminated in the country from December 4th to January 2nd. In addition to special street lighting, it is proposed to floodlight the castle, the war memorial, and some of the principal buildings.

Spain.—HYDRO-ELECTRIC DEVELOPMENT.—A new hydro-electric power station has recently been completed at Alloz by the Sociedad Fuerzas Electricas de Navarra, of Pamplona. The station is situated at the foot of a dam on the River Salada in the province of Navarra. The water stored in the reservoir formed by the dam is used only during the summer periods, primarily for irrigation purposes and partly for power generation. The plant, which works under a head varying between 105 and 210 ft., comprises two 6,000-h.p. Francis-type turbines coupled direct to Oerlikon 4,200-kVA, 5,000-V a.c. generators (375 r.p.m.). The power is stepped-up for transmission purposes to 60,000 V by two Oerlikon transformers.

Stalybridge.—LOAN.—The Joint Electricity Board for the towns of Stalybridge, Hyde, Mossley, and Dukinfield has authorised an application for permission to borrow £50,000 for extensions to mains and services.

Stratford-on-Avon.—OVERHEAD EXTENSIONS.—The Rural District Council has raised no objection to the use of overhead cables by the Leicestershire & Warwickshire Electric Power Co. for the supply of electricity to Edstone Hall, Wootton Wawen, and for similar cables to supply Wimpstone, Whitchurch, to be erected by the Shropshire, Worcestershire & Staffs Electric Power Co.

Sussex.—REDUCED CHARGES.—The Central Sussex Electricity and associated companies have reduced the domestic "unit" charge in the urban areas from 1d. to ¾d. and in the rural areas from 1¼d. to 1d., and the business "unit" charge from 1¼d. to ¾d., and from 1¾d. to 1d. respectively. The business quarterly fixed charge has also been reduced.

Sutton Coldfield.—REVISED TARIFFS.—The Town Council has approved recommendations of the Electricity Committee for revised tariffs as follows: Lighting (separately metered), 4½d. (instead of 4d.); a halfpenny reduction in respect of shop window and outside lighting. Small concessions are also made in regard to payments in advance on the contract rate. The reduction in a full year's revenue is equal to £2,500.

Swansea.—THE GRIT PROBLEM.—The grit problem arising, it is stated, from the generating station stack, is being tackled in earnest by the Corporation, and Mr. W. J. Burr, the borough electrical engineer, has been instructed to experiment with anthracite coal or some other suitable dustless coal for firing the boilers, and to replace the grit-catcher that had been removed to permit a test being made with another form of grit-catcher.

Switzerland.—ELECTRICAL PROGRESS.—According to a return recently issued by the Office Féderale de l'Economie Electrique and the Union des Centrales Suisses d'Electricité, the output of electricity in Switzerland during the six months ended with June last amounted to 1,844 million kWh, as compared with 1,791 million kWh in the corresponding half of 1932. The return relates only to the production of power for distribution to third parties and does not include that produced in plants belonging to the Swiss Federal Railway authorities for traction purposes.

Tiverton.—NEW FLAT RATE.—The Town Council has decided to supply consumers who guarantee a minimum consumption of 1,000 kWh per quarter for not less than a year at a flat rate of 2½d. per kWh, and beyond at 2d. per kWh.

Walsall.—MAINS EXTENSIONS.—The Electricity Committee is to extend mains to housing estates where 106 houses are to be erected, at a cost of £1,010.

Warrington.—FRINGE ORDER.—The Electricity Committee has decided to make an application for a Fringe Order for the supply of electricity to Dunham Massey.

Weymouth.—LOAN SANCTIONED.—The Town Council has received sanction to a loan of £3,797 for a duplicate main from Ferry Bridge to Victoria Square.

Wigton (Cumberland).—SUPPLY TO ABBEY TOWN.—No opposition is to be offered by the Rural District Council to a proposal by the Mid-Cumberland Electricity Co. to erect overhead lines from Wigton to Abbey Town.

Whitby.—LOAN.—The Urban District Council has applied for sanction to a loan of £2,000 for mains and services.

PIER ILLUMINATIONS.—Estimates are to be prepared for providing the necessary cable for illuminations on the West Pier.

Wimbledon.—SUB-STATION.—The Electricity Committee has acquired a site in Greenfield Park, Malden, for the erection of a sub-station.

Winchester.—ELECTRICAL DEVELOPMENTS.—The Rural District Council has consented to the parish of Micheldever and part of the parish of Worston being included in a Special Order applied for by the Mid-Southern Utility Co. The Council has objected to the use of l.p. overhead lines at Itchen Stoke, Martyr Worthy, and Abbots Worthy.

Wooburn and Bourne End.—SUPPLY FROM COOKHAM.—The Parish Council has arrived at an agreement with the Cookham & District Electricity Corporation, Ltd., for a supply of electricity for the parish, which will be available before Christmas.

Traction

Australia.—THE MELBOURNE CABLE TRAMWAYS.—Discussing a suggestion to convert the remaining twenty miles of cable tramways to the electrical system as part of the Melbourne centenary celebrations next year, Mr. A. Cameron, chairman of the Melbourne Tramways Board, said the Board had this object in view, but was considering the possibility of substituting some other form of transport, such as motor or trolley-omnibuses.

Belfast.—At a recent meeting of the Tramway Committee it was agreed to renew the tramway layout at Castle Place.

Japan.—According to the *Far Eastern Review*, up to the end of March last about 270 miles of the Japanese Government railways had been electrified, or approximately 2.8 per cent. of the total system of 9,610 miles. A further five miles of the So-bu line between Ichikawa and Funabashi has since been electrified, while similar work is at present in hand on thirty miles of the Tokaido and Sanyo main lines between Suita and Suma and about thirteen miles of the line between Atami and Numazu. When electric railway traction was first adopted in Japan the locomotives were all of foreign manufacture, but since 1919 the majority have been constructed in the country, the total of machines in operation at the end of March last being given as 131, divided into two standard types—one being equipped with four 230-kW motors and the other with six motors of the same capacity. Various traction systems are in use: the initially electrified lines were operated by 600 V d.c.; later 1,200 V d.c. was adopted on certain lines, while during the past few years the 1,500-V d.c. system has become general. When electric railway traction was first inaugurated in Japan the necessary power was supplied by a steam-generated plant having a capacity of 600 kW. Some few years later, as more power came to be required, it was purchased for some sections from tramway companies. In 1914 the Yaguchi Mond-gas engine power station was established by the Railway Ministry. It had a capacity of 6,000 kW, most of the power which has hitherto been bought being then available from this source. Since that time, the volume of power needed for electric operation has risen steadily, so that in 1920 it became necessary to purchase 50-cycle power from outside sources, and gradually the 25-cycle system was given up. In 1923 and 1930 respectively, the two Government steam-operated power plants at Akabane and Kawasaki, with capacities of respectively 18,000 and 70,000 kW, came into operation, and from these two stations electric power required for railway operation in the Tokyo region can be supplied. There is, however, considerable excess electric power in the vicinity of Tokyo; approximately one-half of that necessary is at present being bought at low rates from private companies.

Norwich.—TRAMWAY ABANDONMENT.—The Corporation reports that the Norwich Electric Tramways Co. has given notice that it proposes to abandon the length of tramway between the junction of Bracondale and City Road and the terminus in City Road.

South Shields.—PROPOSED RAILLESS CARS.—A number of local councillors are formulating a scheme for the abandonment of the bus service between the town and Cleadon Village and the substitution of a railless trolley-car system. The bus service was started in 1914, and every year incurs a substantial loss. Figures show that the cost of working a railless trolley-bus system would be about 11d. per mile and the profit 3d. per mile. The trolley-buses would carry sixty passengers each and would cost £1,500. It is expected that the Town Council will give the matter consideration at an early date.

Sweden.—RAILWAY ELECTRIFICATION.—A *Reuter Trade Service* message from Stockholm states that, according to *Göteborgs Handels och Sjoefarts-Tidning*, the Railway Board is now examining a project for the electrification of the State railway line between Gothenburg and Stroemstad, in the first place the Göteborgs-Uddevalla section (89 km.). When the scheme is completed all the State railway lines terminating at Gothenburg will be electrified. The largest private railway company in Sweden, Bergslagernas Jaernvaegs Aktiebolag, whose main line has Gothenburg as a terminus, will electrify part of its system in the near future.

Communications

China.—WIRELESS BEACONS AT SHANGHAI.—The coastal authorities in Uruguay, Roumania, and China are among the most recent to adopt the Marconi automatic wireless beacon as an aid to navigation for ships. The chain of beacons at the entrance to the Shanghai River is now complete. During the past three months a beacon has been established on the Island of Ta-chi-Shan, otherwise known as Gutzlaff. Since July 20th, another beacon has been established at the lighthouse on the island of Shaweishan, now making three beacons to the Shanghai River approach. The transmitters are simple in operation and are able to run for long periods without attention by skilled personnel. The entire apparatus is controlled by a master clock which switches on the transmitting apparatus at predetermined times, when the transmitter sends out a characteristic signal.

RADIO STATION REGISTRATION.—Though no official scheme for the central control of broadcasting stations in Shanghai has yet been approved by the Council of the International Settlement, practically all stations have now registered with the Chinese Government's Bureau of International Telegraphs and changed their call-signs in conformity with the letters allotted to China by the Geneva Convention. Foreign broadcasters' compliance with the Bureau's regulations is voluntary, but, says *World-Radio*, a noticeable improvement in reception has resulted from the alteration of overlapping wavelengths.

Finland.—RADIO RELAY SERVICE.—It is reported from Helsingfors that the telephone undertaking of that town, following successful trials, is establishing a radio programme relay service for the benefit of its subscribers.

Great Britain.—RADIO LICENCES.—The number of radio receiving licences issued during September was 384,500, a net increase of 66,100 for the month, which increased the total number in force to 5,720,500.

POLICE WIRELESS.—The official view is that for communication between headquarters, *i.e.*, from one police force to another, the present method of line telegraphy, particularly if teleprinter service is available, best meets requirements. The Home Office has accordingly decided that, while the use of wireless for police service is desirable and will not be discouraged, its development should be on an area basis, not national.

RADIO RELAY SERVICES.—The Colchester Corporation Highways Committee has had a further application from Messrs. F. A. Straw (Radio), Ltd., for permission to operate a radio service, but has again declined to grant a permit.

The Friern Barnet Highways Committee has refused British Concessions, Ltd., permission to install a distribution service in the district.

Several companies have renewed their applications to the Glasgow Corporation Streets Committee, which has, however, decided to adhere to its previous resolution that permission to establish relay services in the city be refused.

The Luton Town Council has refused permission for the establishment of another service in the borough.

The Grays Urban Council has refused permission for the establishment of a service for the town.

Hull.—TELEPHONE DEVELOPMENT.—The Corporation Telephones Committee is to alter its equipment, at a cost of £2,000, as a consequence of the introduction of the "on demand" trunk service. It is also to extend the automatic two-party line equipments at the North Newington, Sutton, and Newland exchanges at a cost, with building extensions, of £8,500. Junction equipment is to be installed at Mytongate at a cost of £3,500, which will effect a saving in operating expenses of £630 per annum.

Irish Free State.—RADIO WAVELENGTHS.—Mr. T. J. Monaghan, head of the Dublin P.O. Engineering Branch, who represented the Free State at the recent Amsterdam Radio Conference, announces that the wavelength of the Athlone station is to be altered from 413 to 531 metres, together with those of the Cork and Dublin stations, on January 15th next.

Leeds-Derby.—TRUNK TELEPHONE CABLE.—The recently installed telephone cable between Leeds and Derby is approximately 74 miles in length, and is made up in star-quad formation containing 542 pairs of conductors, each weighing 20 lb. to the mile and loaded at 2,000-yard intervals with 88 mh coils. Initially only 254 pairs were loaded, thus making available 127 four-wire circuits with scope for an additional 144 circuits when loading is completed. The cable contains more high-grade trunk circuits than any other installed in this country. The contract was placed by the G.P.O. with United Telephone Cables, Ltd., and the manufacture and installation of the cable were carried out on their behalf by British Insulated Cables, Ltd., who also installed loading coils and balanced the complete work. The loading coils were manufactured by Standard Telephones & Cables, Ltd.

London.—TELEVISION.—The B.B.C. has decided to experiment with high-definition television through its ultra-short-wave transmitter at Broadcasting House. The first series of tests will be with apparatus installed by Baird Television Ltd., and will go on until the end of 1933. The second series of tests, beginning in January, will be with apparatus installed by Electric & Musical Industries, Ltd. The B.B.C. may, at its discretion, give other companies similar opportunities of installing high-definition television apparatus for transmission experiments. These tests will be experimental and intended primarily for reception by the engineers of the B.B.C. and the television companies concerned. The present thirty-line transmissions radiated by the London National transmitter will be continued until the date of the expiry of the existing arrangement with Baird Television, Ltd., which is March 31st, 1934. No decision with regard to a further series of thirty-line transmissions after that date has yet been made.

New Zealand.—NEW BROADCASTING STATION.—For the new broadcasting station to be erected at Christchurch the New Zealand Broadcasting Board has accepted the tender of Amalgamated Wireless (Australasia), Ltd. Tenders were called for in Great Britain, Australia, the United States, France and Germany. The transmitter will require 20 kW and radiate 3 kW actual power from the aerial. It is understood that similar transmitters are to be provided at Auckland and Dunedin, and that relay stations will be established at Hastings, Invercargill, Napier, Nelson, and Palmerston North.

Contract Information

When "Contracts Open" are advertised in our "Official Notice" pages the date of the "Electrical Review" containing the advertisment is given in parentheses below

Contracts Open

Australia.—MELBOURNE.—Post and Telegraph Department. October 31st. Condensers for use in radio transmitters. (A.Y. 11983.)*
December 5th. Microphones. (A.Y. 12030.)*
December 19th. Telephone dial parts. (A.Y. 12031.)*
December 12th. Telephone parts and accessories. (A.Y. 12032.)* Telephone indicators. (A.Y. 12033.)*
November 28th. Lead-sheathed switchboard cable. (A.Y. 12002.)*
November 21st. Telephone terminal strips. (A.Y. 11996.)*
November 14th. Ringing dynamotors. (A.Y. 11984.)* Telephone ringers. (A.Y. 11986.)* Submarine telephone cable. (A.Y. 11973.)*
December 5th. Telephone switchboard cable. (A.Y. 12015.)*
December 12th. Multiple twin telephone cables. (A.Y. 12016.)*
October 30th. State Electricity Commission of Victoria. 6,600-V current-limiting reactors. (A.Y. 11971.)*
December 4th. 22,000-V switchgear and accessories, comprising oil circuit-breaker equipments with current transformers. (A.Y. 12014.)*

Barking.—October 24th. Electricity Department. L.p. cable. (October 6th.)

Egypt.—CAIRO.—November 14th. Ministry of the Interior. Pumps, electric motors, boilers, &c. (G.Y. 12912.)*
November 30th. Six 50-kVA transformers. (A.Y. 12013.)*
ALEXANDRIA.—October 25th. Ports and Lighthouses Administration. Electric cables, switchgear, transformers, electrically driven hauling winches and motors for the port of Alexandria. Chief inspecting engineer, Egyptian Government, 41, Tothill Street, London, S.W.1. Specifications, &c., 12s., not returnable.

Glasgow.—November 1st. Corporation. Various works, including electric lighting, refrigerating plant, &c., at central police mortuary. Schedules, &c., from Master of Works, City Chambers (Room 81), (£2 2s.). Tenders to Town Clerk.

Ilkley.—October 31st. West Riding C.C. Wiring for electric lighting installation, Middleton-in-Wharfedale Sanatorium, near Ilkley. Mr. J. C. McGrath, clerk to County Council, County Hall, Wakefield.

India.—NEW DELHI.—December 4th. Indian Stores Department. 220/230-V, single-phase, 50-cycle ceiling fans. (A.Y. 11959.)*
December 11th. D.c. ceiling fans. (A.Y. 11965.)*
January 8th. A.c. and d.c. table fans. (A.Y. 11967.)*
October 25th. A.c. and d.c. meters. (A.Y. 11968.)*
November 14th. Single-core flameproof v.i.r. insulated cable. (A.Y. 12010.)*

London.—SOUTHWARK.—November 1st. Borough Council. Electric cables for twelve months ending November 30th, 1934. (September 29th.)

Manchester.—October 30th. Electricity Department. Immersion water heaters and storage type electric water heaters (twelve months' supply). (October 13th.)

New Zealand.—WELLINGTON.—October 26th. Posts and Telegraph Department. 12-V switchboard lamps (A.Y. 11955)* and telephone gongs and attachment nuts. (A.Y. 11956.)*
October 31st. Metal-cased condensers. (A.Y. 11954.)*
December 5th. 2,400 lb. of cored solder. (G.Y. 13046.)*
January 16th, 1934. Public Works Department. Four 1,500-kVA transformers. (A.Y. 12017.)*

Renfrew.—October 31st. County Council. Joint Committee for Maternity Service. Electric lighting and heating installation at maternity hospital, Johnstone. Mr. J. C. Fraser, Clerk to the Committee, County Buildings, Paisley.

South Africa.—JOHANNESBURG.—October 28th. City Council. Five sets of electrically operated traffic signals. (A.Y. 1191.)*
November 4th. Ten 50-h.p. tramcar motors. (A.Y. 12001.)* Tramway traction recorder. (A.Y. 12003.)*
KROONSTAD.—December 4th. Municipal Council. Machinery and plant for a power station. (A.Y. 12004.)* Steam raising plant. (G.Y. 13038.)* Motors, meters, cable, transformers, conductors, kiosks and sundries. (A.Y. 12029.)*
October 28th. Two single-phase 1,620-kVA transformers. (A.Y. 11982.)*
CAPE TOWN.—November 29th. Electricity Department. Fifty automatic street-lighting controllers. (A.Y. 11994.)*
November 1st. House service meters. (A.Y. 12000.)*

Uruguay.—MONTEVIDEO.—November 30th. State Electricity Supply and Telephones Administration. 101,400 metres of lead-covered conductors. (A.Y. 12012.)*
November 29th. 233,000 metres of insulated conductors for outdoor use. (A.Y. 12011.)*

Wakefield.—October 24th. Lighting installation at Royston school and caretaker's house. Education Officer, County Hall.

Walsall.—November 7th. Electricity Department. L.p. cables. (See this issue.)

Wembley.—November 8th. Urban District Council. Carcase wiring, &c., of 150 cottages. (See this issue.)

* Further particulars can be obtained at the Department of Overseas Trade (Inquiry Room), 35, Old Queen Street, S.W.1.

Contracts Closed

Birmingham.—Tramways Committee. Accepted. Fifty railless trolley-bus chassis.—General Electric Co., Ltd.
Electricity Committee. Accepted during past quarter. Reconstruction of rotary convertor equipments at Alma Street and Camden Street sub-stations.—British Thomson-Houston Co., Ltd. Switchgear at Bordesley sub-station.—Harland Engineering Co., Ltd. Switchgear at Park Street and Dale End sub-stations, and Summer Lane generating station, and split pilot protective equipments.—A. Reyrolle & Co., Ltd. Reconstruction of rotary convertor equipments at Alma Street and Water Street sub-stations, and switchgear at Chester Street and Freeth Street sub-stations.—General Electric Co., Ltd.

Dundee.—Corporation. Accepted. Electric lighting installation at Corporation housing scheme (£365).—Stenson & Co.

Ealing.—Town Council. Accepted. Supply and installation of new Gamewell fire alarm system (£2,640).—W. S. Steljes.

Glasgow.—Corporation Cleansing Committee. Accepted. Three batteries for electric vehicles (£270 each, allowing for a deduction in respect of old batteries).—Tudor Accumulator Co.
Two electric vehicles (£2,180).—Richard Garratt Engineering Works, Ltd.
Markets Committee. Accepted. Re-wiring at the fruit market (£826).—Johnstone, Park & Co., Ltd. Re-wiring at the fish market (£603).—T. B. & J. A. Mathieson.

Hyde.—Highways Committee. Accepted. Automatic traffic signals.—Automatic Electric Co., Ltd.

Kendal.—Town Council. Accepted. Reorganisation of the electric lighting at the Town Hall (£155).—R. Hadwin & Sons.

London. — CAMBERWELL. — Highways Committee. Recommended. Traffic signals at six junctions (approximately £2,000).—Automatic Electric Co., Ltd.
FULHAM.—Public Health Committee. Recommended. Electrical refrigerating apparatus, cooling chamber, &c., at the mortuary (£456).—Lightfoot Refrigeration Co., Ltd.

Middlesbrough.—Town Council. Accepted. Three sets of vehicle-actuated traffic signals (£969).—Automatic Electric Co., Ltd.

Newcastle-on-Tyne.—City Council. Accepted. Electrical installation at Barrasford Sanatorium (£485).—Simms & Richardson, Ltd.

St. Albans.—Rural District Council. Accepted. Installation of electric lighting at houses at Redbourn (£106).—Messrs. Griffens.

Scarborough.—Electricity Committee. Accepted. Cables (£437).—Metropolitan Electric Cable & Construction Co., Ltd.; (£268).—British Insulated Cables, Ltd.

Swansea.—Corporation. Accepted. H.p. switchgear for the Civic Centre (£320).—British Thomson-Houston Co., Ltd.

Woodford.—Highways Committee. Recommended. Traffic signals at Maybank Road (£356).—Automatic Electric Co., Ltd.

Forthcoming Events

Birmingham Electric Club.—Friday, October 20th. Grand Hotel, Birmingham. 7.15 for 7.50 p.m. Ladies' evening. Friday, October 27th. Grand Hotel, Birmingham. 7 p.m. "Testing of Full Size Transmission Line Supports." Mr. C. O. Boyse.

Association of Supervising Electrical Engineers.—Saturday, October 21st. Princes Galleries, W. 5.30 p.m. Whist drive, dinner and dance.

British Electrical Development Association.—Wednesday, October 25th. Caxton Hall, Westminster, S.W. 7.30 p.m. "The Art of Public Speaking." Mr. E. Stone.

Institution of Welding Engineers.—Wednesday, October 25th. College of Technology, Manchester. 7.30 p.m. "Resistance Welding and its Applications." Mr. W. L. Wilson. (Invitation to I.E.E. North Western Centre.)

Batti Wallahs' Society.—Thursday, October 26th. Hotel Metropole, W.C. 12.30 for 12.55 p.m. Luncheon. Address by Sir Hoberry Mensforth.

Institution of Electrical Engineers.—Thursday, October 26th. Institution, London. 6 p.m. President's inaugural address. Mr. P. V. Hunter. (*North-Eastern Students' Section*).—Saturday, October 21st. 2.30 p.m. Visit to Messrs. A. Reyrolle & Co.'s short-circuit test plant, Hebburn. Friday, October 27th. Armstrong College, Newcastle-upon-Tyne. 7.15 p.m. "The Dunston 50-cycle Power Station." Mr. A. S. Carr. (*South Midland Students' Section*).—Saturday, October 21st. Visit to Birmingham Gazette, Ltd. (*Mersey and North Wales (Liverpool) Centre*).—Monday, October 23rd. University, Liverpool. 7 p.m. Chairman's address. "Load Building for the Grid." Mr. B. Welbourn. (*North-Eastern Centre*).—Monday, October 23rd. Armstrong College, Newcastle-on-Tyne. 7 p.m. Chairman's address. Mr. F. H. Williams. (*North Midland Centre*).—Tuesday, October 24th. Hotel Metropole, Leeds. 7 p.m. Chairman's address. Mr. J. N. Waite. (*North Western Centre*).—Tuesday, October 24th. Midland Hotel, Manchester. 7.30 p.m. Chairman's address. Mr. G. G. L. Preece. (*East Midland Sub-Centre*).—Tuesday, October 24th. Technical College, Derby. 6.45 p.m. "Electrical Methods of Geophysical Prospecting." Mr. J. McG. Bruckshaw. (*West Wales (Swansea) Sub-Centre*).—Friday, October 27th. Electric House, Swansea. 6 p.m. Chairman's address. Mr. H. K. Benson. (*London Students' Section*).—Friday, October 27th. Institution, London. 6.15 p.m. Chairman's address. "Modern Aspects of Broadcast Valve Manufacture." Mr. F. Jervis Smith.

Junior Institution of Engineers.—Friday, October 27th. Institution, London. 7.30 p.m. "The Electrolytic Theory of Corrosion." Mr. H. E. Yerbury.

Notes

The Scottish Road Passenger Transport Association

The quarterly meeting of this Association (formerly the Scottish Tramways and Transport Association) was held in Glasgow recently, Mr. H. C. Babb, chairman, presiding. At this meeting a new constitution and membership was approved providing amongst other things for (a) a widening of the membership so that the mergers which have recently taken place in Scotland might be represented, and (b) the acceptance of associate members. At the invitation of Mr. L. Mackinnon, general manager, Glasgow Corporation Transport Department, the members visited the Pinkston power station and were shown round by Mr. McDonald, station engineer, and his assistants. Information regarding the Association can be obtained from the honorary secretary and treasurer, 2, St. James' Square, Edinburgh.

Faraday House Dinner

The twenty-fifth annual dinner of the Faraday House Old Students' Association will be held on November 3rd at the Savoy Hotel. The Earl of Rothes, president of the Association, will be in the chair and members may introduce guests, who need not be Faradians. Early application for tickets, 10s. 6d. each, should be made to the hon. secretary of the Association, 66, Southampton Row, W.C.1.

I.E.E. North-Midland Students

The North Midland Students' Section of the I.E.E. commenced its 1933-34 session on Tuesday last, when Mr. W. L. M. French, the chairman, gave an address. During the session the following meetings will be held:—November 14th, Address by Mr. J. N. Waite, chairman of the North Midland Centre; November 28th, "The Economic Application of Electricity to Space Heating," by Mr. T. Illingworth; December 12th, Problems Night; January 16th, Paper by Mr. H. Thompson; January 30th, Joint meeting with graduates of the Institution of Mechanical Engineers, subject, "Remote Control of Machinery"; February 13th, Students' lecture, "Domestic Electrical Apparatus from an Engineering Point of View," by Mr. F. H. Clough; March 13th, "Some Developments in Railway Signalling," by Mr. R. O. Yardley; March 27th, Annual meeting. The meetings will be held at the Hotel Metropole, Leeds. A number of works visits have been arranged.

The Overhead Lines Association

The Association's opening meeting of the session was held at the Institution of Electrical Engineers on Wednesday evening, when the presidential address was delivered by Major T. Rich, O.B.E. His subject was "Factors and Fallacies relating to Rural Electrification."

Fatalities

Returning a formal verdict in a public inquiry in Dunfermline into the death of an electrician, who was killed while repairing a transmission line near Kingseat on July 16th, the jury added a rider that they were of opinion that, whenever such work had to be done on transmission lines, a test as to whether or not the wires were "alive" should always be applied before work was commenced. The evidence showed that the accident occurred through the misunderstanding of a message given by the supervising engineer of the Fife Electric Power Co., who was in charge of the squad, to the engineer in charge of the power station at Townhill, arising out of the fact that the old names of the transmission lines between Townhill and Cowdenbeath had been altered in recent years. It was admitted by the engineer supervisor that wires should be tested before such work commenced, but on this occasion it was not done. His attention had been distracted by another workman during the two minutes in which the accident happened. The men were provided with everything for working in perfect safety.

Rodney Stuart Gray, aged 19, a farm labourer, received a fatal electric shock at South Kilvington, near Thirsk, on October 14th while flying a model aeroplane. He climbed a transmission-line tower, apparently to get better results, and received a shock at 132,000 V.

The Association of Supervising Electrical Engineers

At the first meeting of the Association of Supervising Electrical Engineers for the 1933-34 session, referred to on page 555, Mr. J. Scott Ram, the retiring president, presented the following prizes: Meetings Discussion Awards (donated by Mr. S. B. Donkin), Messrs. C. W. Bullock, E. H. Whatton, and S. W. Hutchings (associate); Highfield Shield Competition (donated by Sir Wm. Noble, Messrs. Callender's Cable & Construction Co., Ltd., and the General Electric Co., Ltd.), Messrs. B. B. Baker, W. R. Dartnall and R. W. Whitley, for papers in the class of members, and Messrs. J. W. Hutchings and A. D. Gooding for papers in the class of associates.

It was announced that a whist drive, dinner, and dance is to be held at Princes Galleries, Piccadilly, W.1, at 5.30 p.m. to-morrow, Saturday. On November 9th, Mr. D. G. Acworth will lecture on "Domestic Electric Cooking in Other Countries" at Magnet House, Kingsway, W.C.2, at 7.15 p.m., and on November 21st Mr. E. M. A. Young will lecture on "Electric Heating of Buildings" at the Lighting Service Bureau at 7.15 p.m.

Ordinary meetings are to be held at the E.L.M.A. Lighting Service Bureau, 2, Savoy Hill, W.C.2, as the lecture hall of the Junior Institution of Engineers is no longer large enough.

Harmonics in Transformer Circuits

Mechanical analogies illustrated with experiments were used by Mr. E. Ambrose in his inaugural address as chairman of the Junior Institution of Engineers in London on October 13th. He said that transformer harmonics could not be economically or entirely eliminated at their source, but when transformers were grouped for use on three-phase circuits the distribution of the harmonics in the windings could be controlled to some extent by the form of connection used.

The influence of power factor on the shape of the current and voltage was demonstrated by oscillograms, showing that the phase angle had some bearing on the magnitude of the harmonic voltages, a lagging harmonic current tending to reduce the harmonic voltages, while a leading current tended to increase them. The third harmonics might be controlled by making use of the delta connection in either the primary or secondary winding, and the fifth and subsequent harmonic currents might be considerably reduced by connecting across the lines a circuit whose impedance was very high to the voltage of the fundamental, although negligible to the harmonic, *e.g.*, a "tuned" circuit. This method, however, was effective only for the harmonics for which it was designed; another method was to introduce across the lines a fifth harmonic voltage which was of equal value, but opposite in phase, to the one which it was desired to eliminate.

Appointments Vacant

Meter tester and repairer for Southampton Corporation.

Lecturer for advanced electrical installation work at the Borough Polytechnic Institute.

Electrical foreman for the Sudan Railways.

Consumers' engineer and mains superintendent for Blackburn Electricity Department.

(See our classified advertisements.)

Makers' Names Wanted

Radio vacuum cleaner.
Coolicon lamp shade.
E.L.V. magneto.
Trix insulated staple.

American Industrial Grouping

In a leaderette on page 543 of this issue of The Electrical Review, reference is made to the latest developments in connection with the efforts of American electrical manufacturers to carry on under the National Recovery Administration. The following, for which we are indebted to the *Electrical World*, is the list of classifications determined by the National Electrical Manufacturers' Association:—

1. *Installation Devices.*—Wiring devices (attachment plugs, lamp receptacle and sockets, snap switches, fuses); knife and enclosed switch; small air circuit breaker; panelboard and distribution board; signalling apparatus.
2. *Appliances.*—Domestic and commercial cooking, heating and motor-driven appliances; fan motors.
3. *Refrigeration.*
4. *Radio.*—Radio receiving tube section.
5. *X-Ray and Electro-Medical Apparatus.*—Sun lamp section, vapour lamp section; X-ray and electro-medical section (X-ray group, electro-medical group).
6. *Industrial Apparatus.*—Electric welding and welding wire; industrial control; motor and generator; industrial heating.
7. *Construction Material.*—Electrical porcelain; insulating material (laminated phenolic products, manufactured electrical mica, moulded insulation, varnished fabric and paper, vulcanised fibre).
8. *Electric Transportation Section.*—Trolley car and bus motor and control group; electric fittings for trolley cars and buses group; heavy traction group; oil and gas-electric locomotive group; gas-electric rail group; mining and industrial locomotive group (coal cutters, underground loading machinery); overhead trolley line materials group.
9. *Generation.*—Prime-movers section (small turbine group, Diesel engine generator set group, gas-electric set group).
10. *Transmission and Distribution Apparatus.*—Electric meter and measuring instrument section; high-voltage insulator; switchgear (distribution cut-outs, large air circuit breaker, oil circuit breaker, power switchboard, power switching equipment, connectors); transformer (capacitors); pole line hardware; underground fibre conduit.
11. *Illumination.*—Commercial lighting; display and window lighting; industrial lighting; flood lighting; street lighting; reflectors (silver mirrored and glass, prismatic, metal, porcelain, continuous metal troughs).
12. *Roughing-in Material.*—Non-metallic conduit, outlet, switch box and conduit fittings; surface raceways; rigid conduit; under-floor duct.
13. *Wire and Cable.*—Armoured conductor and flexible metallic conduit; non-metallic sheathed cable; flexible cord; magnet wire; bare and weatherproof wire; paper cable; varnished cambric cable; alloy wire; bare wire shapes; rod manufacturing; coil; automotive; asbestos, insulated power cable; rubber power cable; rubber-covered building wire.
14. *Dry Batteries and Flashlights.*—Dry batteries and flashlights; carbon and anodes.
15. *Specialities.*—Electronic tubes; small charging, ignition and battery testing equipment; speciality transformers; small fixed condensers.
16. *Electric Tools.*
17. *Telephone Manufacturers.*

Our Personal Column

Electrical men are invited to enable us to keep readers of the "Electrical Review" posted concerning their movements

Mr. J. A. Darby, who has been with Messrs. Herbert Terry & Sons, Ltd., manufacturers of springs, presswork, &c., of Redditch, for eighteen years, eight of which have been spent in the Eastern Counties, is being succeeded by **Mr. R. H. Chambers,** who has been with the company since 1919, latterly representing it in the North of England. Mr. Darby has been appointed sales manager, and is now engaged in sales promotion duties from headquarters at Redditch.

Mr. A. R. Ball has represented Messrs. Terry in London for twenty-five years; in the beginning he worked in close co-operation with the late Mr. Alfred E. Terry. He was formerly a member of the council of the National Hardware Association.

I.E.E. Awards.—The following scholarships have been awarded by the Institution of Electrical Engineers for 1933: *Duddell Scholarship:* Mr. H. Haywood (Stavely Grammar School). *Silvanus Thompson Scholarship:* Mr. P. L. Olsen (Messrs. C. A. Parsons & Co., Ltd.). *Swan Memorial Scholarship:* Mr. D. A. Bell, B.A. (Magdalen College, Oxford). *David Hughes Scholarship:* Mr. R. C. Barton (University College, Cardiff). *Salomons Scholarship:* Mr. R. S. Quick (Bristol University). *War Thanksgiving Education and Research Fund (No. 1):* Grants of £50 each to Messrs. R. G. Armstrong (University College, London), and D. H. R. Whyman (Sheffield University). *Paul Scholarship:* Mr. R. P. Kinsey (Wandsworth Technical Institute). *Thorrowgood Scholarship:* Mr. L. F. Tuff (London and North-Eastern Railway). No award of the Ferranti Scholarship was made this year.

Mr. T. E. Thomas

Mr. T. E. Thomas, general manager of the Central, Southern, and Eastern Sections of the London Transport Tramways has been appointed general manager of the whole of London's tramway system. Mr. Thomas, who succeeded Mr. J. K. Bruce as general manager of the L.C.C. Tramways, entered the service of the London United Tramways Co. in 1899, and became district engineer of the Surrey lines of that company in 1910. Later, he joined the "Underground" group, and, after the absorption of the London General Omnibus Co. by the group, was appointed commercial superintendent of the group of companies. He entered the service of the L.C.C. in 1917 as development superintendent of the Tramways Department, and in 1925 was appointed traffic manager, which appointment he held until the retirement of Mr. Bruce. Formerly there were two general managers of the tramways now controlled by the London Passenger Transport Board, **Mr. C. J. Spencer** being manager of the Northern and Western Sections. Mr. Spencer has recently been appointed a director of the North Metropolitan Electric Power Supply Company.

[*Lafayette*

Mr. C. J. Spencer who has just been appointed to the board of the North Metropolitan Electric Power Supply Co.

Mr. W. M. Wilson, electrical engineer of Clydach, Swansea Valley, who has taken up an appointment as maintenance engineer in the Isle of Guernsey, has received a presentation from the traders of the Valley as a mark of their appreciation.

Mr. D. J. Moon, for many years on the staff of British Insulated Cables, Ltd., and lately with the Precision Electric, Ltd., of Birmingham, has now been appointed sales representative for the latter company for Cheshire and North Wales.

Messrs. J. A. Darby, R. H. Chambers and A. R. Ball

Sir Henry Jackson has been elected chairman of the London and Home Counties Traffic Advisory Committee. **Messrs. G. B. Hart** and **T. W. Maughan** have been reappointed secretary and assistant secretary respectively.

Mr. A. J. Greenly, who is a past-president of the Batti-Wallahs' Society and has long been well known in electrical circles, is the subject of this painting by David Jagger, R.O.I., at the Royal Institute Galleries, 195, Piccadilly, W.1

Mr. H. D. Walkland has been appointed junior mains assistant in the electrical engineer's department, Scarborough, in succession to Mr. R. D. Maynard.

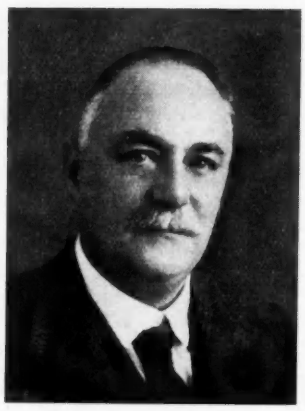
Mr. H. W. Biskeborn has been appointed engineer for the Standard Switchgear Co., of Hornchurch, for London, the South-East of England, and the Eastern Counties. His London office is at Magna Works, Alsen Road, N.7.

Mr. E. Galley, of the staff of the County of London E.S. Co., Ltd., who was recently married at Maldon to Miss P. D. Wright, has been presented by his colleagues with an electric clock.

Mr. P. C. Barnes, for four years manager of the electrical department of the Doncaster works of Pilkington Bros., Ltd., has been transferred to the company's works at St. Helens, and has been presented by the Doncaster electrical staff with a silver cigarette box.

Mr. G. H. Sankey, B.Sc., A.M.I.E.E., the author of the article on "Domestic Tariffs" on page 547 of this issue, was educated at Derby School and Derby Technical College. He served his apprenticeship with the English Electric Co., Ltd., at Stafford, and held positions with that company and with Bruce Peebles & Co., Ltd., and Crompton Parkinson, Ltd. Until recently he was a member of the staff of the Electric Supply Corporation, Ltd., first in Chelmsford and subsequently, as technical assistant, at that company's head office in London. His present address is 32, Linnell Road, Redhill.

Mr. G. H. Sankey



Mr. H. A. Norman White

Mr. H. A. Norman White, who for many years was district manager of Metro-Vick Supplies, Ltd., and subsequently lamp sales superintendent of the Metropolitan-Vickers Electrical Co., Ltd., has now joined Messrs. Drake & Gorham Wholesale, Ltd., as sales manager for the North-Western area.

Mr. I. Le N. Priddy has been appointed sales engineer on the London staff of Messrs. Johnson & Phillips, Ltd.

Mr. Gustaf Sahlin has been appointed vice-managing director of the Elektrolux Company. Mr. Sahlin has been in the employ of the company for about ten years, and has lately been active as the head of its American organisation

Mr. C. R. Westlake, chief engineer and manager of the Electricity Board for Northern Ireland, whose report is dealt with on page 561 of this issue

Mr. H. C. Weeks, who for the past thirty-three years has been the head London representative of the Sun Electrical Co., Ltd., has recently retired from the company's service. Mr. Weeks, who has been an outstanding figure in the electrical trade, has for a long time past been regarded as the doyen of London electrical travellers. At a farewell dinner given to him on October 11th by his associates who have worked with him for the past thirty years, the managing director, Mr. A. G. Beaver, took the opportunity to express to Mr. Weeks, on behalf of all his business associates, their best wishes and the hope that he would have good health and many years in which to enjoy his retirement from the stress of active participation in business. Mr. and Mrs. Weeks are sailing for South Africa on a six-months' trip to-morrow (Saturday), October 21st.

Mr. A. Walkington, of 6, Melton Grove, West Bridgford, Nottingham, and late of Electric Lamp Factors, Ltd., has been appointed by Messrs. J. H. Tucker & Co., Ltd., as their East Midlands representative as from October 23rd.

Mr. J. W. Burton, late publicity manager of Franco Signs, has been appointed to organise the sales department of Messrs. John Ismay (Neon Signs), Ltd. This company was formed recently, in association with Messrs. John Ismay & Sons, Ltd.

Obituary

Lady Parsons.—We learn with regret of the death on Monday last of the Hon. Lady Parsons, widow of the Hon. Sir Charles Parsons, O.M., whom she married in 1883, and whom she accompanied on his voyage to the West Indies, where he died in February, 1931. Lady Parsons was herself interested in engineering and was a founder of the Women's Engineering Society. She also devoted considerable attention to farming.

Col. H. C. Sparks.—We regret to announce the death of Colonel H. C. Sparks, brother of Mr. C. P. Sparks, consulting engineer, which occurred on October 15th, at the age of 59, at a London nursing home. The late Col. Sparks was educated at Temple Grove, Repton and Faraday House, and was a pupil with Messrs. W. H. Allen Sons & Co., Ltd. His first appointment was as assistant engineer with Messrs. Ferranti, Ltd., with whom he carried out, amongst other contracts, the work of the company at Bankside. On leaving Ferranti's he joined Messrs. Babcock & Wilcox, Ltd., as assistant engineer, his work there including the erection of boiler plant at Lots Road power station. His next position was with Yates & Thom, for whom he carried out the erection of engine and boiler plant. In 1907 he became a member of the firm of Sparks & Partners, consulting engineers, and designed power stations, transmission systems, &c., in Great Britain, the United States, and the Dominions and Colonies; he retired in 1926. He joined the London Scottish Regiment in 1900 and in September, 1914, went to France with the 1st Battalion, serving with distinction. He was awarded the M.C., D.S.O., and the Croix de Guerre with Palms for gallantry, and retired with the rank of Colonel, in 1919, about which time the accompanying photo was taken. He was awarded the C.M.G. for his services with the Third Army. He had been a member of the Council of the Institution of Electrical Engineers, and past-president of the Faraday House Old Students' Association, and he was a member of the Institution of Mechanical Engineers. The funeral took place at Peaslake yesterday (Thursday) afternoon, following cremation.

The late Col. H. C. Sparks

Financial Section

New Companies, Returns of Share Capital, Debenture Charges, Reports of Electrical Companies, Dividend Changes, Transactions in Stocks and Shares

New Companies Registered

Halifax Auto Electrical Co., Ltd.—Private company. Registered October 2nd. Capital, £400 in £1 shares. Objects: To carry on the business of manufacturers and repairers of and dealers in dynamos, motors, armatures, magnetos, batteries, conductors, insulators, transformers, &c. The directors are: F. C. Bradley, electrical engineer, and Miranda Bradley, both of 22, West Park Drive, Headingley, Leeds. Registered office: 14, Powell Street, Halifax.

Electrical Equipment Co. (Leicester), Ltd.—Private company. Registered October 9th. Capital, £4,000 in £1 (3,500 ordinary and 500 employés' preference). Objects: To carry on the business of electricians, mechanical engineers, and manufacturers and workers of and dealers in electricity, motive power, &c. Albert V. Wilson, "Maythorn," Stoughton Road, Oadby, Leicester, is governing director and chairman. Solicitors: Edwin H. Middlebrook, Pearl Chambers, East Parade, Leeds.

Stamford Electrical, Ltd.—Private company. Registered October 9th. Capital, £20,000 in £1 shares. Objects: To carry on the business of electrical and mechanical engineers, contractors, suppliers and distributors of electricity, radio and cinematograph manufacturers, &c. The managing director is F. Collins, "Colinholme," Longford Avenue, Southall. Registered office: 115, Clerkenwell Road, E.C.1.

Duplex Relay, Ltd.—Private company. Registered October 9th. Capital, £1,400 in £1 shares. Objects: To relay British broadcasting programmes, &c. The directors are: R. R. Dimock, 6, West End, Ely, and three others. Registered office: 26, High Street, Ely, Cambs.

British Geco Engineering Co., Ltd.—Private company. Registered October 11th. Capital, £500 in £1 shares. Objects: To carry on the business of general, mechanical, civil, metallurgical, electrical, constructional and consulting engineers, dealers in metallurgical plants, concentrating and reduction works, electrical generating plants and systems, &c. The directors are: J. M. Callow, "Nutfield Priory," Redhill, Surrey (chairman); and M. J. Callow, 350, Bay Street, Toronto, Canada (vice-chairman). Secretary: R. J. Thompson, 40, Seymour Gardens, Ilford. Registered office: Adelaide House, King William Street, E.C.4.

E. M. I. Service, Ltd.—Private company. Registered October 9th. Capital, £100 in £1 shares. Objects: To carry on the business of rendering a repair and maintenance service for radio apparatus, gramophones and radio-electrical devices, electrical apparatus, refrigerators, heating and cooking apparatus, &c. The subscribers are: Fdk. J. Groombridge, 67, Badlis Road, Walthamstow, E.17; and Ella L. Bryant, 115, Charlton Road, Kenton, Mdx. Solicitors: Herbert Smith & Co., 62, London Wall, E.C.2.

Danco Manufacturing Co., Ltd.—Private company. Registered October 13th. Capital, £2,000 in £1 shares. Objects: To carry on the business of manufacturers and sellers of radio gramophones, radio receivers, telegraphic, telephonic and electrical instruments, &c. The subscribers are: A. D. Cooper, 28, Denning Road, N.W.3; and J. A. Lawrence, 131, Lewis Mansions, Walham Green, S.W.6. Secretary: L. A. Suffolk, 16, Meadford Road, Streatham Common, S.W.18. Registered office: 345-50, Salisbury House, London Wall, E.C.2.

Visible Vacuum Windows, Ltd.—Private company. Registered October 11th. Capital, £100 in £1 shares. Objects: To carry on the business of engineers, merchants, manufacturers and contractors, ventilating, heating, cooling, drying, electrical, cooking and other apparatus, manufacturers and dealers, mechanical and electrical engineers, electricians, &c. The directors are: G. R. Thursfield, 30, Cheyne Walk, S.W., Capt. L. M. Paterson, Foxhill, Aylesbury, G. A. Mower, 14, Collingham Gardens, S.W., and Major W. H. Ward, 66, Hamilton Terrace, St. John's Wood, N.W. (managing director of Croydon Engi-

neering Co., Ltd.). Registered office: 235, Upper Thames Street, E.C.4.

J. M. Fenn, Ltd.—Private company. Registered October 13th. Capital, £1,000 in £1 shares. Objects: To acquire the business of an electrical engineer and contractor and electrical, wireless and gramophone retailer, &c., carried on by J. M. Fenn at 50, Hammersmith Bridge Road, Hammersmith, as "Fenn & Co." The permanent directors are: J. M. Fenn, 50, Hammersmith Bridge Road, Hammersmith; and W. H. Kirkconel, 28, Rivercourt Road, Hammersmith, W.6. Solicitors: Townsend, Wood & Calderwood, Swindon, Wilts.

Returns of Electrical Companies

Sound Installation Services, Ltd.—Satisfaction in full on September 7th, 1933, of debenture dated September 12th, 1932, and registered September 21st, 1932, securing £200.

Electric & Gas Industries, Ltd.—Satisfaction to the extent of £1,000 on March 3rd, 1933, of debenture authorised April 22nd, 1931, and registered April 23rd, 1931. Notice filed October 3rd, 1933. (According to the register of mortgages, the debentures registered April 23rd, 1931, originally secured £2,000,000.)

Salora Lights, Ltd.—The nominal capital has been increased by the addition of £2,000 in £1 ordinary shares beyond the registered capital of £3,000.

Murex, Ltd.—The nominal capital has been increased by the addition of £25,000 beyond the registered capital of £250,000. The additional capital is divided into 50,000 ordinary shares of 10s.

Associated Utilities, Ltd.—The nominal capital has been increased by the addition of £10,000 in £1 ordinary shares beyond the registered capital of £5,000.

Wireless-Electric (Wholesale), Ltd.—Particulars filed of £2,000 debentures authorised September 27th, 1933, charged on the company's undertaking and property, present and future, including uncalled capital, the whole amount being now issued.

Supra Electra Motors, Ltd.—Issue on September 29th, 1933, of £200 debentures, part of a series already registered.

Young, Osmond & Young, Ltd.—Debenture charged on the company's undertaking and property, present and future, including uncalled capital, dated September 13th, 1933, to secure all moneys due or to become due from the company to Barclay's Bank, Ltd.

Gambrell Bros. & Co., Ltd.—Debenture dated September 15th, 1933, to secure £6,500 and a premium of 6 per cent., charged on certain leasehold lands, buildings and premises at Merton Road, Southfields, S.W., and the company's undertaking and other property, present and future, including uncalled capital. Holder: Sir Frederick Palmer, K.C.M.G., Crowhurst Place, Lingfield, Surrey.

West Devon Electric Supply Co., Ltd.—Capital, £210,000 in 72,000 preference and 138,000 ordinary shares of £1. Return dated September 1st, 1933. 49,527 preference and 100,000 ordinary shares taken up. £34,165 paid on 37,527 preference and 48,513 ordinary shares. £63,487 considered as paid on the remainder. £1,875 calls unpaid. Mortgages and charges, nil.

Siemens & General Electric Railway Signal Co., Ltd.—Capital, £20,000 in £1 shares (10,000 "A" ordinary and 10,000 "B" ordinary). Return dated June 28th, 1933. 3,500 "A" ordinary and 3,500 "B" ordinary shares taken up. £7,000 paid. Mortgages and charges, nil.

Petersfield Electric Light & Power Co., Ltd.—Capital, £20,000 in 6,500 preference and 13,500 ordinary shares of £1. Return dated May 29th, 1933. All shares taken up. £20,000 paid. Mortgages and charges, nil.

Globe & Simpson, Ltd.—Capital, £3,000 in £1 shares. Return dated July 1st, 1933. 5,750 shares taken up. £5,100 paid. £650 considered as paid. Mortgages and charges, nil.

Lancashire Electric Sign Construction Co., Ltd.—Issue on September 29th, 1932, of £100 debentures, part of a series already registered. (Particulars of issue filed September 26th, 1933.)

G. H. Stevens & Co., Ltd.—The nominal capital has been increased by the addition of £1,000 in £1 ordinary shares beyond the registered capital of £600.

Southern Globe Electrical Co., Ltd.—The nominal capital has been increased by the addition of £1,000 in £1 shares beyond the registered capital of £1,000.

C. J. Ferguson & Sons, Ltd.—Capital £5,000 in 2,500 cumulative preferred and 2,500 ordinary shares of £1 each. Return dated August 22nd, 1933. 2,500 preferred and 1,802 ordinary shares taken up. £2,802 paid on 1,000 preferred and 1,802 ordinary shares. £1,500 considered as paid on 1,500 preferred shares. Mortgages and charges, nil.

City Notes

Richard Johnson, Clapham & Morris report a net loss for an accounting period of fifteen months of £12,942, as compared with a loss of £44,781 for the preceding twelve months, making a debit balance to be carried forward of £199,484.

Erinoid, Ltd. reports trading profits for the year ended July 31st last of £48,034, and a net profit of £41,845, as compared with £37,214 in the preceding year. It is proposed to place £9,239 to tax reserve and to pay a dividend of 11½ per cent., less tax (against 10 per cent.). General reserve receives £10,000, the amount carried forward being increased from £6,699 to £6,743. Meeting: October 26th.

The Norwich Electric Tramways Co., reports a net profit for the year ended June 30th last of £17,429, to which is added £628 brought in. Reserve receives £4,000, a final dividend of 2½ per cent. is paid, maintaining the total distribution for the year at 5 per cent., and £857 is carried forward. The report states that the proposed purchase of the company's tramway and omnibus undertaking by the Norwich Corporation was not completed, and the electors have recorded a majority vote against the proposal.

The Electrolytic Zinc Co. of Australasia reports a net profit for the year ended June 30th last of £223,093, after providing £145,000 for amortisation and depreciation and £49,705 for taxation. This compares with a profit in the preceding year of £85,090. Out of the profit £21,000 is appropriated for the debenture sinking fund reserve, and £20,000 for new plant and development. Two payments on account of preference dividend arrears have been made during 1933, bringing payments down to December 31st, 1932.

Philips' Incandescent Lamp Works Holding Co. has reduced the nominal value of its shares by 25 per cent., and a payment of 25 per cent. in cash will be made to shareholders. Holders of "British unit" certificates issued by the Royal Exchange Assurance will be entitled to the sterling equivalent of 2.50 fl. per unit of 10 fl. nominal, conversion being effected on the day when funds are received, or as soon after as practicable at the current buying rate for sight drafts on Amsterdam.

Aron Electricity Meter, Ltd., has decided to issue 75,968 £1 ordinary shares, mainly for the purpose of retiring the outstanding £90,355 six per cent. income debenture stock. These shares are offered to shareholders by way of "rights" at £1 7s. 6d. per share. Shareholders may apply for one share for every share held. The shares will rank *pari passu* with the existing issued ordinary shares.

The Ever Ready Trust Co., Ltd., has declared an interim dividend of 4 per cent. (actual) on both the ordinary and deferred shares. This is the first interim dividend declared and is in respect of the period January 1st, 1933, to March 31st, 1934.

The Sun Electrical Co., Ltd., has announced a dividend on the 7½ per cent. cumulative preference shares for the half-year to October 31st.

The Calcutta Electric Supply Corporation, Ltd. has declared an interim dividend on the ordinary share capital of 5 per cent. (actual).

The Anglo-American Telegraph Co. is paying the usual quarterly dividend of ¾ per cent. on the ordinary stock.

The Oriental Telephone & Electric Co., Ltd., has declared an interim ordinary dividend of 4 per cent., tax free (same).

Callender's Cable & Construction Co., Ltd., has declared an interim dividend of 5 per cent.

Stocks and Shares

TUESDAY EVENING.

THE bolt from the blue represented by the withdrawal of Germany from the League of Nations had the effect of checking business in Stock Exchange markets, and of introducing a dull tone over prices as a whole. For a time the markets did not seem able to make up their minds as to what the effect would probably be, but as things settled down so there was a little buying of the bargain-hunting order, with the result that actual losses were of no great account. Taking a longer view than that which looks at the immediate prospect, it may be justifiably argued that alarms and excursions abroad will force capital to remain at home in such cases as those where stability is the main object. The trade of the country is improving, as every week indicates in the published news and statistics. Abroad, there are confusion and uncertainty. At home, the accumulation of capital goes on unceasingly, and that capital will be restricted more and more, by foreign perplexity, to investments in companies whose principal activities are found in this country.

North Metropolitan Electric

The market for home electricity supply shares is unaffected by the action of Germany, and its sequelæ. The shares continue, in point of fact, to improve in value. It is seldom that any substantial number comes to market, but towards the end of last week a deal was effected in a fair-sized parcel of North Metropolitan Electric ordinary shares, a large line changing hands at 59s 9d., and being offered at 60s. The first block was promptly taken, and the price moved up a few pence. The North Metropolitan Company is paying 10 per cent. dividends, giving, of course, 3¼ per cent. on the money to the purchaser of to-day. The company has been making issues of new shares from time to time during the past seven years, and these issues have provided substantial bonuses. The modesty of the present yield of £3 6s. 8d. per cent. is tempered by the possibility of further new issues in the future, the company being progressive, and having plenty of scope for expansion. It is to these new issues that the buyers of to-day look for a better yield than 3¼ per cent. on their money, and the fact of there being a useful number of shares available, which in itself is something of a rarity, aroused interest and attention.

Home Electricity Supply

County of London ordinary shares strengthened ⅛, to 38s. 3d. Electric Supply Corporations have reached £4 a share, showing a gain of ⅜ on the week. This latter price compares with 57s. 6d., at which the shares were standing a few months ago, and is exactly double the lowest figure touched this year. As previously mentioned, the rise is due to anticipations of a bonus issue. Notting Hill preference at 13¾ show a rise of 5s., the shares being bought on the return which they offer. Other companies' preference shares are in request, and various prices improved in consequence.

North Eastern ordinary shares at 32s. 6d. have further advanced, and Midland Electric Power at 45s. show a rise of ½, while Clyde Valleys have now arrived at the round 40s.

Electric Finance and Securities have been a good market, leaving off, however, below the best of the week, at 66s. 9d. Southern Areas at 26s. 9d. are slightly down. On the other hand, West Gloucestershire ordinary at 69 shows a gain of 6 points. British Light & Power, still an active market, continue at 20s. 6d. A spurt of a florin carried Atlas ordinary to 11s., from which there was a reaction to 10s. Hendons are better at 56s. 9d. Bournemouth & Poole retain their last week's gain at £4, and Northamptons at 53s. 9d. are $\frac{1}{16}$ harder. Victoria Falls ordinary at 5⅜ have shed part of their previous jump.

Gilt-edged Stocks

Of the London Transport issues there is already but little stock obtainable in the market. One firm of Stock Exchange jobbers is offering £2,500 Transport "B" 1965-2005 at 119¾, giving £4 4s. per cent on the money. The stock is eligible for trustees, and the interest started from July 1st this year. The prices of the Central Electricity Board and the London & Home Counties J.E.A. stocks show little change. Central Electricity 5 per cent. of 1950-1970 is quoted a point down at 113. On the other hand, London Transport "B" at 119½ is the fraction up, and the "C" at 86 shows a gain of a point. "Money" stocks, such as these securities must be now held, are subject to two cross-currents of exactly opposite tendency. In the first place, if there should be trouble abroad, the effect would be to put up rates in Lombard Street, and thereby bring about a corresponding heaviness amongst the prices of gilt-edged securities. On the other hand, another result of the same kind of trouble would be to force money into home securities, as already indicated in the opening paragraph. It may be surmised that holders are not likely to part from their interests in British undertakings at a time like the present.

Manufacturing and Equipment

Callender's announce an interim dividend of 5 per cent., and the shares, at 68s. 3d. are 3s. 3d. better. Enfield Cable ordinary advanced to 4½. The shares of the Enfield Rolling Mills Company keep steady at 26s. 3d. General Electrics hardened to 45s. 3d. Aron Electricity Meter has announced an issue of ordinary shares of £1 each, to be offered to shareholders at 27s. 6d. The rights are one new share for each old share held. The price of the old shares was standing at 60s. Ex rights, the shares are quoted at 43s. 9d. The chairman referred to the coming of the new issue when the meeting was held in the middle of July last. Ever-Ready shares are unchanged at 29s. 6d. The Ever-Ready Trust Company has declared an interim dividend of 4 per cent. on ordinary and deferred shares, being the first time that the Trust has announced an interim dividend. The ordinary stand at 22s. 3d. It may be recalled that the Trust repaid its shareholders 10s. per share of capital a few months ago, and, curiously enough, this has led to a number of mistakes being made in connection with dealings in the shares. Some of the proprietors, forgetting that they had received half their money back, sold the full number of shares which they previously held, finding themselves in the position of being unwitting bears, and having, of course, to repurchase the shares that they had over sold.

Cables and Wireless

The prices of the Cables & Wireless combine have given way under the pressure of comparatively little selling, but a good deal of sentiment. There is nothing fresh to account definitely for the decline in the prices. Speculation has been selling a good deal in one market and the other during the past few days; Cables & Wireless have been turned out with the rest. Next month's Lord Mayor's Show will have as its central feature a pageant of Imperial and International Communications. Cables & Wireless, London Transport, and other leading bodies have promised to provide fifteen cars in this particular section. Great Northern Telegraphs have reacted to 32. The 4 per cent. debenture stocks of the Eastern Extension, Eastern Telegraph, and Western Telegraph Companies have declined to the common level of 99½. American Telephone & Telegraph stock at 130½ shows a gain of 3 points. On the other hand, a sharp spasm of flatness overtook International Telephones, and the price dropped to 12¼, leaving a fall of 2¼ on the week.

Miscellaneous Matters

In spite of the fact that American Telephone & Telegraph shares are well up on balance, other dollar stocks are decidedly lower. Montreal Light & Power have dropped to 36, Shawinigans to 18. Brazilian Tractions at 13 are a point down. Rio de Janeiro tramway bonds have shed 5, going back to 10 per cent. The position in America is viewed still with a good deal of nervousness, although the centre of international anxiety has shifted to Berlin.

Iron and steel shares have been in lively demand. Prices were rushed up rather too abruptly. The German affair served to temper previous exuberance, and the market took on a more subdued complexion. Many rises remain. Babcock & Wilcox at 39s. 6d. are a florin to the good. Vickers touched nearly 9s. before reacting to 8s. 6d. The market has been a centre of active dealings. In rubber shares, business tapered off to a condition approaching its customary quietude in this department.

Share List of Electrical Companies

	Nom.	Approx. Dividend. 1931.	1932.	Price, Oct. 17.	Rise or Fall.	Yield. £ s. d.
HOME ELECTRICITY COMPANIES.						
Bournemouth and Poole	1	15	15	80/-	—	3 15 0
Brompton Ordinary	1	8½	7	33/-	—	4 4 10
Charing Cross Ordinary	1	8¼	7	34/6	—	4 1 2
Chelsea	1	8¾	7	32/6	—	4 6 2
City of London	1	10	10	33/9	—	4 3 0
Clyde Valley	1	7	7	40/-	+1/9	3 10 0
County of London	1	10½	10½	58/3	+⅜	3 12 0
Edmundson's 7% Pref.	1	7	7	34/-	+1/-	4 2 4
Elec. Dis. Yorkshire	1	9	9	48/9	—	3 13 9
Elec. Supply Corporation	1	11	11	80/-	+⅝	2 15 0
Kensington Ordinary	1	8	7	34/-	—	4 2 4
Lancs Light and Power	1	7	7	36/6	—	3 17 2
London Electric	1	9	7	38/6	—	4 3 7
Metropolitan	1	10	10	52/6	—	3 16 0
Midland Counties	1	7	7	37/6	—	3 14 8
Mid. Elec. Power	1	8	8	45/-	+½	3 11 1
North Eastern Electric Ordinary	1	6	6	33/6	+6d.	3 11 8
Do. 7% Pref.	1	7	7	33/-	—	4 4 10
Northampton	1	10	10	55/-	+⅜	3 12 9
Notting Hill 6% Pref.	10	6	6	13¾	+¼	4 8 11
North Met. Elec. 6% Pref.	1	6	6	30/-	—	4 0 0
St. James' and Pall Mall	1	8	7	34/-	—	4 2 4
Scottish Power	1	8	8	40/-	—	4 0 0
South London	1	8¼	7	33/6	—	4 3 7
Westminster Ordinary	1	8¼	7	34/-	—	4 2 4
Whitehall Elec. Invst. 7½% Pref.	1	7½	7½	21/3	—	7 1 2
Yorkshire Elec.	1	8	8	47/6	—	3 7 6
PUBLIC BOARDS.						
Central Electricity, 1950–70	Stock	5	5	113	—1	4 8 6
Do. 1951–73	,,	4½	4½	109½	—	4 2 2
Do. 1963–93	,,	—	3½	93¾	—	3 14 8
London & Home Counties, 1955–75	,,	4½	4½	110	—	4 1 10
London Passenger Transport, A	,,	—	4½	116	—	3 17 7
Do. do. B	,,	—	5	119½	+½	4 3 8
Do. do. C	,,	—	—	86	+1	—
TELEGRAPH AND TELEPHONES.						
American Tel. & Tel.	$100	9	9	130½	+3	6 18 6
Anglo-Am. Tel. Pref.	Stock	6	6	114	+¼	5 5 3
Do. Def.	,,	1½	1½	28½	—	5 5 3
Cables & Wireless 5½% Pref.	,,	2¾	2¾	76½	—2	3 11 11
Do. A 7½% Ord.	,,	Nil	Nil	26	—1	—
Do. B Ord.	,,	Nil	Nil	12½	—½	—
Globe Tel. and T. Ord.	10	Nil	2½	10⅜	—	2 0 0
Do. do. Pref.	10	6	6	12½	—	4 16 0
Great Northern Tel.	10	20	20	32	—½	6 5 0
Marconi-Marine	1	10	7½	28/9	+⅜	5 9 1
Oriental Telephone Ord.	1	12	12	2⅜	—	*4 3 6
HOME AND FOREIGN TRAMS, ETC.						
Anglo-Arg. Trams First Pref.	5	Nil	Nil	4/6	—	—
Do. do. 2nd Pref.	5	Nil	Nil	1/6	—	—
Do. do. 5% Deb.	Stock	Nil	Nil	7½	—	—
British Electric Traction Df. Ord.	,,	5	5	500	—	—
Do. do. Pref. Ord.	,,	8	8	144½	—	5 10 9
Brazil Traction	100	—	—	13	—1	—
Brit. Columbia Elec. Rly. Pce.	Stock	5	5	103	—	4 17 0
Mexico Trams, 5% Bonds	—	5	5	29½	—	16 19 0
Mexican Light Common	100	Nil	Nil	7½	—	—
Do. 7% Pref.	100	7	7	11	—4	—
Do. 1st Bonds	—	5	5	50	—	10 0 0
Victoria Falls Ord.	1	15	20	5⅜	—3	3 14 3
Yorkshire (West Riding)	1	Nil	Nil	15/-	—	—
MANUFACTURING COMPANIES.						
Assoc. Elec. Ord.	1	4	4	20/-	—	4 0 0
Do. Pref.	1	8	8	30/9	—	5 4 2
Babcock & Wilcox	1	14	9	39/6	+2/-	4 11 2
British Aluminium Ord.	1	5	5xd.	28/3	—	3 11 0
British Insulated Ord.	1	15	15	73/9	+⅛	3 19 2
Brush Ord.	Stock	Nil	Nil	37	—	—
Callender's	1	15	15	68/3	+3/3	4 8 0
Do. 6½% Pref.	1	6½	6½	31/3	—	4 3 2
Crompton Parkinson Ord.	5/-	22½	—	18/3	—	6 5 7
Do. 8% Pref.	1	8	8	30/-	—	5 6 8
Edison-Swan 1st Pref.	1	7½	7½	24/6	—	6 2 5
Do. 5% Deb.	Stock	5	5	102½	—	4 17 7
Electric Construction	1	Nil	Nil	8/9	—	—
Enfield Cable Ord.	1	25	25	93/9	+½	5 6 5
English Electric	1	Nil	Nil	10/-	—	—
Do. do. Pref.	1	Nil	Nil	15/-	—	—
Ever Ready	5/-	35	35	29/6	—	5 18 8
Ferranti Pref.	1	7	7	27/-	—	5 3 8
G.E.C. Pref.	1	6½	6½	32/-	—	4 1 2
Do. Ord.	1	8	8	45/3	+3d.	3 10 8
Henley's	1	30	30	6½	+⅛	4 12 4
Do. 4½% Pref.	5	4½	4½	5½	—	4 5 9
India-Rubber	1	Nil	Nil	3/3	—	—
Johnson & Phillips	1	5	5	20/9	—⅛	4 16 5
Siemens Ord.	1	7½	6½	23/9	—	5 9 5
Telegraph Construction	£1	Nil	Nil	23/9	—	—

* Dividends paid free of Income Tax.

Published Specifications

Compiled expressly for this journal by a firm of chartered patent agents. The numbers in parentheses are those under which the specifications will be printed and abridged and all subsequent proceedings taken.

1931

34775. "Connectors for electric conductors." G. H. Scholes & Co., Ltd., G. H. Scholes and F. J. Pearce. December 16th, 1931. (398859.)

34982. "Luminous vacuum tube for television, telekinematography and like applications." Compagnie pour la Fabrication des Compteurs et Matériel d'Usines à Gaz. March 16th, 1931. (Addition to 33697/31.) (398860.)

35192. "Electric discharge lamps." British Thomson-Houston Co., Ltd. December 20th, 1930. (398799.)

1932

1311. "Electrolytic production of insulating layers on metals." P. R. Coursey, C. H. Marcus and Dubilier Condenser Co. (1925), Ltd. January 16th, 1932. (398825.)

1384. "Electric light sources." General Foods Corporation. January 22nd, 1931. (398840.)

1749. "Thermionic valve amplifiers." Dubilier Condenser Co. (1925), Ltd. January 21st, 1931. (398826.)

5027. "Apparatus for producing intermittent electric current impulses." British Thomson-Houston Co., Ltd. February 19th, 1931. (398802.)

5061. "Electric gaseous discharge lamps." A. Lederer. February 20th, 1931. (398829.)

5180. "Electric discharge lamps." Claude-Lumière Soc. Anon. pour les Applications des Gaz Rares à la Lumière-Procédés G. Claude. December 19th, 1931. (Addition to 393308.) (398830.)

7262. "Television reception arrangement with Braun tube." M. Von Ardenne. March 31st, 1931. (Addition to 35266/31.) (398804.)

7343. "Electric power-converting apparatus." British Thomson-Houston Co., Ltd. March 11th, 1931. (398864.)

7884/5. "Electrical hearing aids for the deaf." M. Birley and H. M. Wharry. March 16th, 1932. (398836/7.)

8207. "Electric heating appliances of the open grid or boiling plate type." N. W. Gilbert. March 19th, 1932. (398810.)

8215. "Insulation and construction of electric cables, wires and conductors." Greengate & Irwell Rubber Co., Ltd., and R. Povey. March 19th, 1932. (398811.)

8230. "Apparatus for measuring or indicating the power factor of an alternating current supply system." Elliott Bros. (London), Ltd., and G. F. Shotter. March 19th, 1932. (398838.)

8259. "Telephone systems or the like." Automatic Electric Co., Ltd., J. W. McClew and G. T. Baker. March 19th, 1932. (398812.)

8260. "Electrical signalling systems." Automatic Electric Co., Ltd., T. R. Rayner and G. D. Turton. March 19th, 1932. (398813.)

8352. "Isolating switches for use with overhead electric lines." J. E. Stewart and R. T. Norton. March 21st, 1932. (398822.)

8375. "Television apparatus." Fernseh Akt.-Ges. March 27th, 1931. (Addition to 356565.) (398870.)

8376. "Methods of synchronising television apparatus." Fernseh Akt.-Ges. March 27th, 1931. (398871.)

8437. "Electric plate warmers and table lamps." F. Guggisberg. March 22nd, 1932. (398848.)

8526. "Radio and other high-frequency modulated carrier wave systems." Marconi's Wireless Telegraph Co., Ltd., and W. T. Ditcham. March 22nd, 1932. (398853.)

8539. "Circuits for photo-electric cells." Electrical Research Products, Inc. March 30th, 1931. (398856.)

8609. "Locomotives of the Diesel electric type." Sulzer Frères Soc. Anon. February 27th, 1932. (398876.)

8511. "Electric signalling systems." Standard Telephones & Cables, Ltd., and E. F. Bates. March 23rd, 1932. (398877.)

8706. "Thermionic valve detectors." Hazeltine Corporation. April 1st, 1931. (398882.)

8768/69/70. "Metal-clad electric switchgear." A. Reyrolle & Co., Ltd., and A. Allan. March 24th, 1932. (398889/90/91.)

8809. "Electrically actuated indicating devices." J. H. Henderson and W. R. Sykes Interlocking Signal Co., Ltd. March 24th, 1932. (398893.)

8821. "Electrical signalling systems." Automatic Electric Co., Ltd., and T. R. Rayner. March 24th, 1932. (398895.)

9198. "Electro-dynamic propulsion." F. B. Hopewell. April 16th, 1931. (398917.)

9424. "Electric cables." Siemens Bros. & Co., Ltd., and J. Riedl. April 1st, 1932. (398920.)

9630. "Electric motor control." A. Tustin and Associated Electrical Industries, Ltd. April 4th, 1932. (398926.)

9840. "Electric condensers." Dubilier Condenser Co. (1925), Ltd. (W. Dubilier). April 6th, 1932. (398929.)

12334. "Fusible electric cut-out." Callender's Cable & Construction Co., Ltd., and A. W. Metcalf. April 29th, 1932. (Cognate application 33117/32.) (398942.)

13344. "Heavy-current electric circuit-breakers." J. Swinney and Associated Electrical Industries, Ltd. May 9th, 1932. (398953.)

15126. "Illuminated display signs." H. Pearce, A. N. Haworth and Associated Electrical Industries, Ltd. May 27th, 1932. (398961.)

17140. "Telephone systems." General Electric Co., Ltd., and V. N. Halliday. June 17th, 1932. (398970.)

17348. "Circular grip for electric cords." R. Nettl. June 20th, 1932. (398970.)

18408. "Electric torches and the like." Ever-Ready Co. (Great Britain), Ltd., and F. Beeston. June 29th, 1932. (398977.)

20429. "Rotors for dynamo-electric machines." G. A. Juhlin, T. H. Charlton and Associated Electrical Industries, Ltd. July 19th, 1932. (398984.)

20962. "Electric propulsion systems." British Thomson-Houston Co., Ltd. July 24th, 1931. (398989.)

21648. "Electric incandescent lamps." General Electric Co., Ltd., B. P. Dudding and A. E. Woolgar. August 2nd, 1932. (398994.)

22883. "Amplifiers and wireless transmitting circuits." G. W. Walton. August 15th, 1932. (Addition to 375831.) (399004.)

25256. "Electric conductor clamp." F. Morris. September 10th, 1932. (399012.)

25723. "Signal receiving systems." British Thomson-Houston Co., Ltd. September 15th, 1931. (399016.)

29421. "Devices for locking electric lamps in lampholders." C. R. Lown. October 21st, 1932. (399027.)

31391. "Control of gaseous electron discharge tubes." G. Stansbury and G. C. Brown. November 7th, 1931. (Addition to 375031.) (399033.)

32559. "Electrolytic cells." R. Jahre (trading as R. Jahre Spezialfabrik für Kondensatoren). November 17th, 1932. (399037.)

32573. "Control apparatus for vehicles of the Diesel-electric type." Sulzer Frères Soc. Anon. December 4th, 1931. (399038.)

33906. "Electric discharge vessels." Naamlooze Vennootschap Philips Gloeilampenfabrieken. December 9th, 1931. (399041.)

33927. "Electric protective systems." International General Electric Co., Inc. November 30th, 1931. (399042.)

1933

1565. "Choke-coils for electric distribution systems." British Thomson-Houston Co., Ltd. (Allgemeine Elektricitäts Ges.). January 17th, 1933. (399058.)

1688. "Radio direction-finding receivers." Marconi's Wireless Telegraph Co., Ltd. January 18th, 1932. (399059.)

1806. "Overload circuit-breakers." H. Trinkl. May 30th, 1932. (399060.)

2448. "Underground cable for high- and low-pressures." K. Jordan. January 25th, 1933. (399066.)

2571. "Thermionic amplifying arrangement suitable for use in radio receivers.' Marconi's Wireless Telegraph Co., Ltd. January 26th, 1932. (399068.)

3135. "Modulated carrier-wave transmitters." Telefunken Ges. für Drahtlose Telegraphie. February 1st, 1932. (399074.)

4411. "Oscillation generators." Telefunken Ges. für Drahtlose Telegraphie. February 11th, 1932. (Addition to 36782/32.) (399085.)

4413. "Variable condensers." Marconi's Wireless Telegraph Co., Ltd. February 11th, 1932. (399086.)

5096. "Device for the utilisation of the electro-therapeutic action of the auto-galvanic weak current." W. Lengeling. March 9th, 1932. (399092.)

5807. "Electric switches or circuit-breakers." British Thomson-Houston Co., Ltd. February 25th, 1932. (399096.)

5964. "Thermionic amplifiers." Telefunken Ges. für Drahtlose Telegraphie. February 25th, 1932. (399098.)

8957. "Kinematograph films for use in television and the like." Fernseh Akt.-Ges. March 24th, 1932. (398858.)

9367. "Television apparatus." W. H. Peck. March 28th, 1932. (399108.)

17555. "Devices for interchanging lighting units in illuminating-apparatus." Naamlooze Vennootschap Machinerieen-En Apparaten Fabrieken. July 7th, 1932. (399134.)

22695-6. "Electric discharge lamps." British Thomson-Houston Co., Ltd. December 20th, 1930. (Divided applications on 398799.) (398615 and 398824.)

Trade Mark Applications

The following are among the recent applications for British trade marks. Objections against any of the proposed marks may be entered within one month from October 11th :—

Monarch. No. 533525. Class 6. Electrically driven suction cleaning machines for domestic use.—British Electrical and Manufacturing Co., 7-13, Clavering Place, Newcastle-on-Tyne.

Resitex. No. 543654. Class 6. Machinery of all kinds and parts thereof.—Robert Bosch Gesellschaft, Stuttgart. (British representatives: W. P. Thompson & Co., 12, Church Street, Liverpool.)

Laziboy. No. 544517. Class 8. Radio-gramophones and parts thereof.—S. B. West, 42, Lyncroft Gardens, N.W.6.

Maxolite. No. 544610. Class 8. Electrical batteries (not for medical purposes).—Redfern Stevens, Ltd., 177, Alma Street, Birmingham.

T.E.T. (lettering and design). No. 539992. Class 16. Porcelain and earthenware. No. 539993. Class 18. Engineering, architectural and building contrivances.—Electric Transmission, Ltd., Kingsbury Road, Islington, N.1.

A Protective Coating for Aluminium

A TRANSLATION from the German has been made by the British Aluminium Co., Ltd., of Dr. Gustav Eckert's prize-winning paper in the International Aluminium Competition of 1932. Its subject is "The M.B.V. Surface Treatment for Aluminium and its Alloys," which is new to this country. The process consists in placing the aluminium parts to be protected in an aqueous solution of anhydrous sodium carbonate and anhydrous sodium chromate at a temperature of from 90 to 110 deg. C.; typical proportions of the salts are 5 per cent. and 1.5 per cent. respectively. The solution is maintained at boiling point for from three to five minutes; the aluminium is then washed in hot water and dried. Tests have shown that about 17 sq. yd. of surface can be protected per gallon of solution at a cost of 3d. per sq. yd. The plant may also be operated at lower temperatures with a somewhat different composition of the solution. It is claimed that the M.B.V. film cannot be detached by rolling or bending, and that it gives a high resistance to corrosion to pure aluminium and to copper-free aluminium alloys in the presence of a large range of chemical material. The subject is still being studied, but the indications are that it will open up a new field for the use of aluminium and its alloys.

New Work for Contractors

Particulars of new works and building schemes for the use of electrical installation contractors and traders

Publication in this list is no guarantee that electrical work is definitely included. Alleged inaccuracies should be reported to the Editors.

Aberdeen.—Buildings for Scottish Amicable Building Society (£15,000); T. Scott Sutherland, architect.

Alderley Edge (CHESHIRE).—Cinema, London Road, for Mrs. A. Crossley.

Amersham.—Houses (22), Ridgeway Estate, Stanley Hill (electrical work); P. Brazil & Co.

Ashby-de-la-Zouch.—Houses (30), Measham, and 30 houses, Oakthorpe, with electrical work; Goddard & Wain, architects, Station Chambers, High Street, Coalville.

Ashton-in-Makerfield.—Houses (60); J. Lavin Garswood and E. Ashton, builders.

Ayr.—Houses (854), various sites; Wm. Reid, city architect.

Basingstoke.—Houses (84), South Ham (£21,031); Coles Bros., Ltd., contractors, Bath.

Batley.—Houses (88), Brookroyd, for W. P. Armitage, Dewsbury; W. Hanstock & Son, architects, Branch Road.

Bedford.—Cinema, St. Peter's Street, for Mr. Simmons, Letchworth.

Birkenhead.—Houses (58), Manor Hill Estate; Hamilton Estates, Ltd.

Birmingham.—Houses (30), Hazel Oak Road, Shirley, for Jones & Croxford, 29, Waterloo Street; R. H. Davis, builders, 3, Burman Road, Shirley. Houses (42), Tinkers Farm Estate; Jones & Garfield, Ltd. Airport (£70,000), and branch libraries, Yardley Wood and South Yardley (£27,500); city engineer. R.C. church, Yardley Wood Road, Billesley; G. Bernard Cox, architect, 109, Colmore Row. Elementary school, Ilmington Road, and extensions, Hope Street School; Percy W. Cox, Ltd. Elementary school, Jervoise Road; B. Whitehouse & Sons, Ltd. Extensions, Wolsey Motors (1927), Ltd., Ward End Works, Drews Lane (£20,000), with electrical work; E. L. Turner, builders, St. Vincent Street, Ladywood.

Bognor Regis.—Odeon Theatre, London Road (electrical work); Oscar Deutsch, of Cinema Service, Ltd., Birmingham.

Brierley Hill (STAFFS).—Houses (48), Hawbush Estate; George Smith (Birmingham), Ltd., Kings Norton, Birmingham.

Broadstairs.—Houses (28), Northdown Road, St. Peter's, for W. Ward; Moody & Chrisfield, architects, Station Gates.

Burnley.—Houses (1,413); borough surveyor.

Carlisle.—Omnibus station, Lowther Street; architect, Ribble, Motor Services, Ltd., Preston.

Cheltenham.—Houses (200), various sites; borough engineer.

Darlaston.—Houses (50); Hammonds Bros., and L. Griffiths, builders.

Darlington.—Houses (30); R.D.C. surveyor.

Derby.—School, Markheaton Park (£53,500), for the Governors of Derby School; clerk.

Dingwall.—Academy (£51,000); county clerk.

Douglas (I.O.M.).—Houses (150); Universal Housing Co., builders.

Driffield (YORKS).—Houses (24); the U.D.C. surveyor.

Droitwich.—Houses (44); R.D.C. surveyor.

Dundee.—Bathing pool, entertainment pavilion, &c., Broughty Ferry; city architect.

Dunfermline.—Maternity hospital (£27,000); burgh surveyor. High school (£35,000) with electrical work; Master of Works.

Durham.—Houses (50), Sherburn Road; city surveyor.

Eastbourne.—Public health and school medical clinics (£16,000); borough surveyor.

East Grinstead (SUSSEX).—Houses (48), Sackville Estate; U.D.C. surveyor.

East Lothian.—Secondary school, Haddington (£22,000), for C.C.; county clerk, Haddington.

East Sussex.—Girls' secondary school, Hove (£21,887); John Marsland & Sons, Ltd., builders.

Edinburgh.—Houses (122), Corstorphine; Hepburn Brothers, builders. Houses (46), Robb's Loan; J. Miller, builder.

Falkirk.—Houses (£59,000); burgh surveyor.

Friern Barnet.—Houses (126), Church Farm Estate; Halliwick Estate Co. Houses (33), Torrington Avenue; F. J. Lawes & Son.

Gainsborough.—Houses (270); U.D.C. surveyor.

Glasgow.—Houses (1,000); architect, housing department.

Grimsby.—Houses (280); borough surveyor.

Hampton.—Houses (33), Westbrook Avenue; R. Hewitt, Ltd.

Hebburn-onTyne.—Houses (100); H. Paterson, U.D.C. surveyor.

Hemel Hempstead.—Houses (50), Woodlane; borough surveyor.

Hertfordshire.—Schools, Bushey Mill Lane, Watford (£15,000), Mill End, Rickmansworth (£12,800), and Bricket Wood (£6,860), for County E.C.; director of education, Hertford.

Houghton-le-Spring (DURHAM).—Houses (292); R.D.C. surveyor.

Hull.—Houses (304), Endyke Estate (£90,246); Simms, Sons & Cooke, Ltd. Cinema, Holderness Road; Astoria Cinema (Hull), Ltd.

Ilford.—Houses (86), Ardwell Avenue; W. Goodchild & Co. Houses (100), Ramsgill Drive, &c.; J. Aldridge.

Irvine.—Houses (200), with electrical work; burgh surveyor.

Isle of Man.—School, Pulrose Estate, Douglas, for E.C.

Kelso.—Town hall (£10,000); W. Barclay, architect, Glasgow.

Kendal.—Houses (86); A. Schofield, builder, Gildersome, Leeds.

Kent.—Central school and infants' school, Swanscombe; county architect, Maidstone.

Kirkintilloch.—Houses (98); burgh surveyor.

Lanarkshire.—Reconstruction of Motherwell R.C. high grade schools, for County E.C.; J. Stewart, county architect, 20, Albert Street, Motherwell.

Leeds.—Houses (37), Middleton Estate (£9,943); F. Clough. Houses (126), Potternewton Estate (£35,230); W. Thompson & Sons. Houses (64), Torre Estate (£17,216); S. Flockton.

Lewes (SUSSEX).—Shops and offices, Western Road, for P. D. Stonham.

Lincoln.—School, St. Giles' Estate (£11,000), for E.C.; city surveyor.

Littlehampton.—Houses (70), Castle View Estate; Lynes Estate Co.

London (CATFORD).—Shops and garages, Perry Hill; S. F. Prior, surveyor, Catford Bridge. (EALING).—Houses (105), Devon Close, for Hillingdon Estates Co.; Swannell & Sly, architects, High Street, Rickmansworth. Factory for Viktor Jakl, Aintree Road; Percy Bilton, Ltd., 113, Park Street, W.1. Factory for the County Perfumery Co., North Circular Road; F. E. Simpkins, architect, Park Royal Road, N.W.10. Factory for Polak's Frutal Works, Wadsworth Road; R. B. J. Selby, 48, Dover Street, Piccadilly, W.1.

Luton.—Houses (93), Dallow Road, for E. A. Craig & Co. Houses (32), Runley Road, for A. H. Horne.

Macclesfield.—Houses (28), Poynton-with-Worth; J. H. Walters, architect, Moody Street, Congleton.

Malling (KENT).—Houses (24), Pratling Street, Aylesford; R.D.C. surveyor, West Malling.

Manchester.—Cinema, Wythenshawe Estate (£30,000), with electrical work; Chas. Hartley, architect, 128, Buxton Road, Stockport.

Margate.—Houses (24), Draper's Avenue, for N. T. Wing.

Marlborough.—Houses (32); R.D.C. surveyor.

Merton (SURREY).—Church, Whatley Housing Estate (£9,200); Rev. J. E. Jagger, vicar.

Middlesbrough.—School, Brambles Farm Estate, for E.C. (£16,000); L. Brown & Sons, builders, Stockton.

Nantwich.—Houses, Wallfields Estate; U.D.C. surveyor.

Newcastle-on-Tyne.—Houses (24), Jesmond Dene Road; Storey & Alderson, builders. Cinema, Shields Road, for the Tyne Pictures, Ltd.; Davidson, Eason & Harkness, contractors.

Northampton.—Houses (30), Abington Estate; Sabin & Young, Ltd.

Oldham.—Houses (629); borough surveyor.

Ongar (ESSEX).—Houses (50); R.D.C. surveyor.

Paignton.—Houses (63), Marldon Road; J. H. Maunder.

Plymouth.—Cinema, Exeter Street; Mexboro, Ltd. School extensions, Palace Court (£9,549); Pearn Bros., Ltd.

Portsmouth.—Houses (30), Wymering; borough surveyor. Central bus depôt, Eastern Road (£12,975); Frank Bevis, Ltd.

Reigate.—Houses (94), Colesmead Estate; borough surveyor.

Ripon.—Houses (38); R.D.C. surveyor.

Rochester.—Municipal aerodrome; city surveyor.

Rotherham.—Houses (280), Eastwood, borough engineer.

Ruthergien.—Church (£30,000) for the R.C. Diocesan Board of Authorities, Glasgow; the Bishop.

St. Albans.—Houses (37); R.D.C. surveyor.

Saltcoats (AYRSHIRE).—Houses (109); Hugh Thompson & Sons, architects, 60, Hamilton Street.

Scarborough.—Underground conveniences and subways (£8,000); J. P. Watson, borough engineer.

Seaton Delaval.—Houses (43); J. Barrow, builder, Burns Street, Jarrow-on-Tyne.

Short Heath (STAFFS).—Houses (41); U.D.C. surveyor.

Skegby.—Water supply scheme, Blidworth, with pumps and electrical motors and equipment in duplicate; L. Dodsley, surveyor, Portland Chambers, Sutton-in-Ashfield.

Skelmanthorpe.—Cinema for the Skelmanthorpe Premier Pictures Cinema, Commercial Road; J. Ainley, architect, 25, Market Street.

Southampton.—School, Shirley Warren (440 places), for Borough E.C.; director of education.

Stanley (DURHAM).—Houses (250); U.D.C. surveyor.

Stretford.—Houses (35), Lindum Avenue; Smith & Alcock. Houses (26), Montrose Avenue; H. Grimshaw.

Sunbury.—Cinema at the corner of French Street; Sparkes & Co.

Sunderland.—School, Ford Estate, for E.C.; O. T. Mark, architect, Education Offices.

Tonbridge.—Telephone exchange and Government offices, Avebury Avenue, for H.M. Office of Works, King Charles Street, London, S.W.

Trowbridge.—Houses (350); U.D.C. surveyor.

Tunbridge Wells.—Cinema and shops, corner of Mount Pleasant and Church Road, for J. O. Fairbrother.

Tynemouth.—Houses (127), North Road Estate; C. P. Sherwin, architect, 1, Kingsway. Cinema, Billy Hill Lane; P. L. Browne & Sons, architects, Pearl Buildings, Newcastle-on-Tyne.

Wakefield.—Houses (40), Ings Road and Thornhill Street; city architect.

Ware (HERTS).—Houses (82); R.D.C. surveyor.

Washington.—Houses (56); U.D.C. surveyor, R. J. Swaddle.

Wednesbury.—Houses (100); A. Booth, architect, Town Hall.

Whitley Bay.—Cinema, Cauldwell Lane, Monkseaton; L. A. G. Pritchard, architect, Leith Offices, 34, Moorfields, Liverpool.

Wigan.—Houses (436); borough surveyor.

Willenhall.—Council offices and fire station (£14,750); U.D.C. surveyor.

Wimborne.—Houses (32); C. P. Unwin, builder, Bournemouth.

Workington.—Houses (60), Salterbeck Estate; T. Armstrong, Ltd.

Worsley (LANCS).—Houses (106), Engine Fold site; U.D.C. surveyor.

Worthing.—Houses (32), Fletcher Road; S. C. Phillips. Art gallery extensions (£10,597); borough engineer. Cinema, &c., Bath Place, for Universal Estates, Ltd.; F. C. Mitchell, architect.

Wrexham.—Nurses' home, War Memorial Hospital (£18,600); John Hughes (Contractors), Ltd., builders.